

Initial results of Cypher implantation for "true" bifurcations lesions

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Purpose: To compare an acute clinical outcome in the patient with Drug Eluting Stent (DES) for the true bifurcated lesion. Method : January, 1999 to September, 2004, 116 stent implantation (average age 11 ± 66) for the true bifurcated lesion. We classified into the three groups. Bare metal stent (BMS) groups (131 cases) which implant BMS for the main coronary branch, s-DES groups (29 cases) which implant single DES for the main coronary branch, and m-DES groups (8 cases) which implanted DES for the main and the side branch. The examination items were initial success rate, Acute Gain (mm) and restenosis rate. Result: 1. For the main branch, initial success rates were similar among the three groups (BMS 100% v. s. DES-1; 100% v. s. DES-2; 100%). For the side branch success rates were (BMS 96% v. s. DES-1; 100% v. s. DES-2; 100%). 2. Acute gain before to after Stent implantation were (BMS 0.77 ± 0.54 mm v. s. s-DES; 1.2 ± 0.65 mm v. s. m-DES; 1.25 ± 0.75 mm). 3. No sub-acute thrombosis were observed among three groups in the 6 month follow up. 4. For the BMS group restenosis rate was 25.1% of main branch, and 42.4% of rates of side branch. m-DES and s-DES group's restenosis rate was 0% of main branch, and 0% of rates of side branch. conclusion: Conclusion: Initial success of the DES implantation for The true bifurcation lesion is favorable, and the 12-month long term clinical outcome will be expected.

Occurrence of procedural-related complications depends on the timing of ballooning at the side-branch in bifurcation lesions

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[Purpose] The clinical efficacy of sirolimus-eluting stent (SES) has been well documented however the strategy to bifurcation lesions still remains problem in SES era. [Methods] We examined consecutive 30 patients who underwent percutaneous coronary intervention (PCI) to bifurcation lesions with protected wire into side branch. All side branches were treated with ballooning only but not stenting if necessary. Patients were classified into two groups; Ballooning to side branch (SB) before stent deployment in main branch (MB) (group 1), Ballooning to SB only after stent deployment in MB (group 2). [Results] Eight patients were classified into group 1 and 22 patients were into group 2. Mean age was 67.6 years old in group 1 and 65.5 in group 2. Mean size of stent in MB was 2.75 mm and 2.77 mm, size of balloon to SB was 2.13 mm and 2.13 mm (p=ns). SES was used to MB in most of the cases. Kissing balloon technique (KBT) as final ballooning in the procedure was used in 50.0% and 54.5% (p=ns), procedure time was 72.5 min and 50.4 min (p=0.0333). Procedure related complication such as myocardial infarction and ventricular fibrillation occurred in 2 cases (25.0%) in group 1 and 0 in group 2 (p=0.0644). [Conclusion] Ballooning to side branch in bifurcation lesion prior to stenting to main branch led to significantly prolonged procedure time and tended to cause more complications. Hence less intervention to side branch and final KBT may be feasible strategy to bifurcation lesions even in the SES era.

Kissing balloon technique after stenting in LAD/diagonal bifurcation lesions: Comparison with Stenting Alone

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Background: Lesions at coronary bifurcations represent a challenging area in interventional cardiology. Because the use of bare metal stents (BMS) for both branches has not improved the results, we implanted one stent for main branch and performed kissing balloon technique (KBT) at coronary bifurcation lesions. Methods: To examine the adverse effects of KBT against restenosis of main branch stent, patients with LAD/diagonal bifurcation lesions (side branch >1.5mm) were divided into either stenting of the main branch with KBT (KBT group, n=52) or without KBT (Non-KBT group, n=91). Follow-up coronary angiography was performed 6 months after the procedure unless necessary for clinical reasons at an earlier time. Results: There were two cases of stent thrombosis (2%) in non-KBT group. There were no differences between the two groups in stent size and stent length (3.0 ± 0.3 mm vs. 3.1 ± 0.4 mm, 19.8 ± 7.0 mm vs. 18.2 ± 6.5 mm, respectively). Although relative gain (=acute gain/ reference diameter) was significantly smaller in KBT group than in Non-KBT group (0.89 ± 0.15 vs. 0.95 ± 0.12 , $p < 0.05$), loss index (late loss/ acute gain) was similar between the two groups (0.34 ± 0.33 vs. 0.36 ± 0.26). The total TLR rate at 6 months was 29.8%, and it was not significantly different between KBT group (37%) and non-KBT group (26%). Conclusion: Use of a BMS with KBT in bifurcation lesions did not lead to a high TLR rate in the main branch. There were no adverse effects of KBT against main branch stent restenosis.

Early and mid-term outcomes for PCI using drug-eluting stents in bifurcation lesions

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PURPOSE) Percutaneous coronary intervention (PCI) for bifurcation lesions remains technically challenging. So we examined strategy of PCI for bifurcation lesions. METHODS and RESULTS) Between August 2004 and March 2005, we performed PCI in 59 patients (acute myocardial infarction, 7; unstable angina, 6; stable angina, 46) with bifurcation lesions using drug eluting stent (DES). Number of treated vessels was 9, 39, 9 and 2 (LMT, LAD, LCX and RCA). Procedural characteristics were the following. Only POBA with kissing balloon technique (KBT) was performed in 36 patients, only wire protection in the side branch, T stenting and Crush technique was done in 12, 6 and 4 patients. We evaluated angiographic outcomes right after PCI and at 8 months later by quantitative coronary angiography (QCA). CONCLUSIONS) In our hospital, In our hospital, the cases of PCI for bifurcation lesions have been increasing in the era of DES. We report early and mid-term outcome of percutaneous coronary intervention for bifurcation lesions.

Safety and efficacy of Cypher for coronary bifurcation lesions

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Background: Although Cypher stent (CS) has been reported to reduce restenosis in selected lesions, safety and efficacy of CS for coronary bifurcation lesions remains to be solved. Aim: To evaluate the safety and efficacy of CS for coronary bifurcation lesions. Method: 158 coronary bifurcation lesions (reference diameter of side branch (SB) > 2.0 mm by visual estimation) of 109 patients (age: 66.2 ± 11.2, male ratio: 78.0%) were included in this study. Bifurcation lesions were divided into 6 types according to the plaque location. The incidence of major adverse cardiac events (MACE; death, myocardial infarction, and any target vessel revascularization; TLR) and restenosis rate were evaluated at 6-month follow-up angiography. Result: All lesions were treated successfully, and there were no in-hospital MACE except for 3 (2.8%) death (Heart failure: 1, Ischemic colitis: 1, hemorrhage: 1). During follow-up period (6.1 ± 0.7 months), there were 5 MACE (In-hospital death: 3, TLR: 2 (main branch restenosis: 1, side branch occlusion: 1)). Six-month follow-up angiogram (n=34) revealed that restenosis rate was 8.8% (main branch restenosis: 1, side branch occlusion: 2). Conclusion: This study demonstrates the feasibility and safety of CS implantation for coronary bifurcation lesions. At the meeting, we will present more intimate results, especially restenosis rate and predictors of restenosis.

Exaggeration of neo-intimal hyperplasia following bare metal stenting in type B bifurcation lesions- a serial volumetric IVUS study -

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Background: Despite successful stent implantation, restenosis rates are considerably higher in bifurcation lesions, specifically in locations of type B bifurcation lesions (stenosis in the main vessel, just beyond major side branch). The purpose of this study was to investigate the relative contribution of stent area and neointimal hyperplasia on late lumen loss in this lesion subset. **Methods and Results:** Serial volumetric IVUS analyses (pre-, post-intervention and 6-month follow-up) were performed in 101 native left anterior descending coronary arteries treated with bare metal stent. Based on the location of the main vessel stenosis in pre-interventional IVUS, all lesions were divided into two groups: 1) Type B (post-branch) bifurcation lesions; the narrowest cross-sectional lumen area located in the main branch and within 3mm distal to the major side branch or 2) non-type B lesions; that did not meet this criteria. Volume index (VI=volume/length) was calculated for vessel, stent, lumen, plaque and neointima (VVI, SVI, LVI, PVI and NVI) in the stented segment. Percent neointimal volume (%NV=NVI/SVI*100) was calculated to standardize SVI. Type B bifurcation lesions were observed in 42 and non-type B lesions in 59 stented segments. All pre- and post intervention IVUS measurements were similar between the two groups. At 6-month follow-up, however, NVI and %NV were significantly larger in type B bifurcation lesions (3.01 ± 1.41 vs. $2.46 \pm 1.14 \text{mm}^3/\text{mm}$, $p=0.03$ for NVI, 38 ± 19 vs. $31 \pm 14\%$, $p=0.02$ for %NV). **Conclusion:** Exaggeration of neointimal hyperplasia occurs more frequently in IVUS defined type B bifurcation lesions regardless of original vessel morphometry and mechanical scaffolding.

Investigation into the Y-Stent Technique with the Cypher Stent

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DES (Cypher Stent) was implanted on 78 cases 102 lesions in our clinic. In generally, it is said that restenosis rate is quite high on Y-Stent cases of bear metal stent and lower restenosis rate on Y-Stent cases of DES. Y-Stent technique was applied to 5 cases in our clinic.

In this report, the restenosis rate of Y-Stent technique on Cypher Stent and final kissing balloon technique were investigated with cine angiography and IVUS. Kissing balloon technique was applied on 4 cases and the alternative balloon was applied on 1 case.

Conclusion

Restenosis was not observed at follow up diagnosis on all 5 cases, which are not only kissing balloon cases but also without kissing balloon cases. There was no hyperplasia of plaque on overlap part of stents with IVUS observation in all 5 cases. We will follow up further with cardioangiography on condition of intima.

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The Rinku experience with crushed Cypher stents

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Background and Purpose Cypher stenting has been shown dramatically low restenosis and TLR ratio in simple lesions. However, Cypher stenting for bifurcation lesion showed relatively higher restenosis and TLR ratio. We have been performing IVUS guided Crush Cypher stenting for bifurcation lesion because theoretically it will be the best way to complete stent apposition in bifurcation. The purpose of this study is to evaluate acute clinical data of IVUS guided Crush Cypher. Method: 43 lesions in 40 cases underwent IVUS guided Crush Cypher stenting from September, 2004 to June, 2005. The average age was 64.8 years old (38 - 82). Result: Crush stenting was successfully performed in 42 (97.7%) of 43 cases. IVUS assessed main branch at pre and bifurcation site at post in all cases. Final KBT could be performed in 41 of 42 cases (97.6%), with additional new wire in 9 cases (21.4%), and additional new small size balloon in 14 cases (33.3%). The PCI procedure time was 77 ± 31 min. MACCE was observed in 1 case (2.4%, acute thrombus). Conclusion: Crush Cypher stenting is considered to be one of the safety and optimal procedures for bifurcation lesions.

Treatment of bifurcation lesions using the "crush-stenting" technique: a comparison of the transfemoral and transradial approaches

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[Purpose] Crush Stenting Technique (CST) for bifurcation lesions by transfemoral approach is technically feasible, though the feasibility and safety of step CST by transradial approach have not been defined. We compared the clinical outcomes of patients treated with CST by transfemoral to step CST transradial for the true bifurcation coronary lesions.

[Methods] From April 2004 to April 2005, 56 consecutive patients (36 males; mean age: 54 ± 18 years) with true bifurcation lesions were treated both with CST by transfemoral approach (n=30) or step CST by transradial approach (n=26). The immediate results and clinical follow-up data were analyzed and compared between the two approach groups.

[Results] At baseline, except for the 4 left main cases in transfemoral approaches group, there were no difference between the two approach groups in terms of lesion location, stenosis and length, the diameter and the length of the deployed DESs, and the maximal inflation pressure (all $P > 0.05$). The procedure success rate was both 100%, and only two patients (one in each group) failed to perform final kissing balloon inflation, with one complicating subacute thrombosis in side branch and subsequent myocardial infarction (MI) within 12 hours after the procedure in transradial group. No death and other MACE occurred in-hospital and during a mean of 6-month clinical follow-up.

[Conclusion] Step CST by transradial approach is as feasible and safe as CST by transfemoral approach, with high procedure success rate and good short-term clinical outcome.

DES for ostial LAD lesions

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Background:Ostial lesions of LAD have higher restenosis rate and risk of plaque shift to left main (LMT)or other ostium. Drug eluting stent (DES)might decrease restenosis rate in these complex lesions. Method and Result:Twenty five ostial lesions(LAD 22 LCX 1 LMT 2 denovo 21 reste 4)were treated with Cypher stent. IVUS was performed in all cases. In seven lesions, single spot stent at ostium without jeopardizing LM and LCx ostium was performed. Fourteen lesions with apparent plaque existence were performed crossover stenting from LM across the LCx and added with kissing balloon angioplasty. Two cases involved both ostial lesions were treated with crush stenting additionally kissing balloon dilatation. Three cases was treated with culotte technique. Clinical success was achieved in all lesions. There was no MACE in hospital. Conclusion:Implantation of DES on ostial lesions of LAD and/or LCX appears to be a feasible and safe approach. We expect that the occurrence of restenosis will decrease comparison with bare metal stent.

Impact of plaque debulking before Cypher stent implantation in LAD ostial CTOs

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[Purpose] Plaque debulking before stent implantation is a promising strategy to avoid plaque shift and bifurcation stenting in LAD just proximal lesions but it is uncertain whether plaque debulking reduces restenosis of LMT to LAD ostial lesions uncovered by Cypher stent. We evaluated the results of DCA before Cypher stent implantation strategy in LAD ostial CTO lesions. [Method] We treated three patients. Two patients were male and one was female whose mean age was 61 y. o. Two cases were restenotic lesions after DCA and one case was a de novo lesion. After guide wire crossing and predilation by small size balloon, DCA was performed under IVUS guiding. After that procedure, Cypher stent was implanted in just proximal LAD not to cover LCX ostium. [Result] Two cases needed postdilation using bigger balloons due to stent malaposition in DCA sites. There was no slow flow in LAD and LCX nor new stenotic lesion of LCX ostium. [Conclusion] LAD ostial CTO lesions could be successfully treated by DCA and DES strategy without bifurcation stenting and stent jail. We will report mid term follow up results about these cases including CAG and IVUS findings in the forthcoming meeting.

Use of directional coronary atherectomy in the DES era; anecdotal data from a single center.

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Purpose: Recent works have reported that directional coronary atherectomy (DCA) is useful for treating bifurcation and ostial lesions. However, in the era of drug-eluting stent (DES), there is ongoing controversy on the role of DCA. **Methods and Results:** We assessed interventional characteristics of 36 lesions of 30 pts in whom DCA was performed for de novo and restenotic lesions in the DES era (from August 2004 to May 2005) compared with 35 lesions of 27 pts before DES era (from January to August 2004). Lesions and procedural characteristics are described in table. **Conclusions:** We described datum from DCA-associated coronary interventions in our hospital. When judiciously used, DCA still may have a definite role in the management of bifurcation or ostial lesions even in the DES era. Updated data will be presented at the CCT 2005.

	Previous Des Era	Des era	P-value
Overall PCI	202 lesions of 142 pts	303 lesions of 215 pts	
DCA-assisted PCI	35 lesions of 27 pts	36 lesions of 30 pts	
%DCA(lesions)	17%	12%	N.S.
No. diseased vessels	1.4±0.5	1.7±0.6	<0.05
Indications(%)			0.11
ISR	4(11)	3(8)	
De novo	26(74)	32(89)	
Bifurcation of LMT	11(31)	21(58)	
Bifurcation of branches	4(11)	6(17)	
RCA ostial	2(6)	0	
Bifurcation and ostial lesions	17(49)	27(75)	0.056
Target Lesion(%)			0.08
LMT alone	3(9)	0	
LMT-#6	10(26)	18(50)	
LMT-#11	0	3(8)	
RCA	4(11)	1(3)	
mid-LAD	17(49)	12(33)	
Adjunctive Procedure(%)			<0.05
POBA alone	15(43)	8(22)	
KBT	0	4(11)	
BMS	0	1(3)	
Cypher		6(17)	
Cypher (Y-stent)		1(3)	
Follow-up	6 months		
Restenosis(%)	8(23)		
TLR(%)	5(14)		

The DK Crush technique improves clinical outcomes in patients with bifurcation lesions

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[Purpose] Treatment of bifurcation lesions in coronary artery still was technical challenging even in the era of modern stents. Several reports demonstrated that crush technique with final successful kissing balloon angioplasty resulted in better outcomes than any other techniques for coronary bifurcation lesions. However, successful rate of final kissing balloon angioplasty immediately after stenting main vessel has not been reported. We therefore designed this prospective study to compare classical crush technique by Colombo et al. with modified crush technique (named as DK crush technique).

[Methods] 40 consecutive patients with coronary bifurcation lesions were enrolled into the present study and divided into classical and DK crush groups (each with 20 consecutive patients). Intravascular ultrasound was used to assess whether the procedure was successful.

[Results] Successful rate of kissing balloon angioplasty in DK crush group was significantly higher than in classical crush group (100% vs 80%, $p < 0.05$). Average procedure time in DK group was 55 ± 12 min., shorter than in classical group (86 ± 17 min., $p < 0.05$). There were significant difference in contrast volume and balloon numbers used during procedure between classical group and DK crush group (268 ± 17 ml and 4.2 ± 1.1 vs 176 ± 23 ml and 2.4 ± 0.6 , respectively, $p < 0.05$).

[Conclusion] In conclusion, final successful kissing balloon angioplasty was an important index to predict outcomes and restenosis in side branch. The main reasons why DK crush technique improved the outcomes lies in its complete successful kissing angioplasty.