Recanalized Chronic Total Occlusions Covered by Sirolimus-Euting Stents

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Background: Chronic total coronary occlusions leading to residual myocardial ischemia may be recanalized and scaffolded by stents. The initial and long-term efficacy of this treatment with bare stents is well known. A high restenosis rate (20-30%) remains the main limitation. At present, there is little information on the use of Rapamycin-eluting stents (Angelini et al) to treat chronic total occlusions (CTO). We report our experience with the use of drug eluting sirolimus stents to cover recanalized chronic total occlusions in patients with angiography.

Methods: Since May/02 we have prospecively analyzed the initial and late findings observed in a consecutive series of 86 patients (pts) with angiographic chronic total coronary occlusion in whom we attempted recanalization and subsequent covering by RES. The mean age was 60±10 years; 65 (76%) were male. The underlying clinical condition in 51 pts was stable angina in 15 pts and unstable angina in 71 pts; 34 had a previous myocardial infarction. The estimated occlusion time in 49 pts was 9±21 months; however, the overall duration of symptoms (pts) with angina pectoris due to chronic total coronary occlusion in whom we attempted recanalization and subsequent covering by RES was performed. Results: Primary success was achieved in 74 pts. In the remaining 12 pts (14%) we failed to cross the occlusion. Two pts (2.3%) had a cardiac tamponade that was resolved by pericardial drainage in the emergency room. All recanalized pts became asymptomatic. After a mean clinical follow-up time of 6±3 months, 5 pts (6%) needed new target lesion revascularization. Thirty-nine-nine pts underwent 6-month follow-up angiographic and intracoronary ultrasound (IVUS) re-evaluation. The mean neointimal area, as derived by IVUS, was 1.1±1.8 mm². Results: Primary success was 95.3%. During hospital stay, no patient died; 3 (4.7%) patients had myocardial infarction. Two pts (2.3%) had a cardiac tamponade that was resolved by percutaneous drainage.

Conclusions: The use of drug-eluting stents to cover recanalized chronic total occlusions is safe and seems to significantly reduce the need for further target vessel revascularization.

Evaluation of Sirolimus-Euting Stents for the Treatment of Bifurcation Lesions: A Real World Study

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Background: Although bare metal stents have been a useful therapeutic modality for the treatment of bifurcation lesions using a "provisional T stenting strategy", they have not eliminated the problem of restenosis. Sirolimus-eluting stents have been shown to markedly decrease restenosis in selected lesions.

Methods: We evaluated from our prospective database on bifurcation lesions the outcomes of patients who underwent treatment with sirolimus-eluting stents.

Results: Between May 2002 and July 2003, a total of 140 patients underwent coronary stenting for the treatment of bifurcation lesions and of these 48 patients (49 lesions) were treated with regular guide-wires. Once recanalization had been achieved (86%) balloon dilation and subsequent scaffolding with RES was performed. Results: Primary success was obtained in 74 pts. In the remaining 12 pts (14%) we failed to cross the occlusion. Two pts (2.3%) had a cardiac tamponade that was resolved by pericardial drainage in the emergency room. All recanalized pts became asymptomatic. After a mean clinical follow-up time of 6±3 months, 5 pts (6%) needed new target lesion revascularization. Thirty-nine-nine pts underwent 6-month follow-up angiographic and intracoronary ultrasound (IVUS) re-evaluation. The mean neointimal area, as derived by IVUS, was 1.1±1.8 mm². Results: Primary success was 95.3%. During hospital stay, no patient died; 3 (4.7%) patients had myocardial infarction. Two pts (2.3%) had a cardiac tamponade that was resolved by percutaneous drainage. Compared with bare metal stents, sirolimus-eluting stents appear to reduce restenosis after bifurcation stenting. The "crush" technique is proposed to further reduce restenosis by improving stent and drug application to the side-branch ostium.

Aims: To investigate the "crush" technique for drug-eluting platforms, to identify pitfalls and clarify the best implantation strategies.

Methods and Results: Each stage of the "crush" technique was photographed in a bifurcation phantom for 3 stent designs (BxVelocity, Express II, and Driver). Simultaneous side-branch and main vessel post-dilatation (“kissing” balloons) with appropriately sized balloons, fully expanded the stent in the side-branch ostium (A to B in figure), widened the gaps between stent struts covering the side-branch, and prevented or corrected main vessel stent distortion which occurred if the main vessel was post-dilated with an under-sized main vessel balloon (C)

Conclusions: Appropriate side-branch and main vessel post-dilatation is needed to expand the stent at the ostium fully, to widen gaps between stent struts overlying the side-branch (facilitating subsequent access), and to prevent stent distortion. These principles applied to all bifurcation stent strategies and stent designs tested.

The Crushung Technique for Bifurcation Lesions: Immediate and Mid-Term Clinical Outcome

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Background: different modalities of stenting have been proposed for bifurcational lesions requiring one or two stents positioned with different techniques.

Methods: we report the immediate and 6-months clinical outcome of a new stenting technique employed in the first 91 consecutive bifurcational lesions from 86 patients using drug eluting stents (Sirolimus, n=73, Taxus, n=18). This new mode of bifurcational stenting, reproduces the same steps of the modified T-stenting with the only difference being the protrusion of the side branch stent into the main vessels for 4-5 mm from the carina. The aim of this technique is to ensure that the ostium of the side branch is circumferentially covered with stent struts with the additional advantage of a higher dosage of eluted drug near the bifurcal site.

Results: angiographic success was reached in all the lesions (final kissing balloon inflation in 63% of the lesions). Bifurcational lesions were located as follows: LAD-diagonal (63%). The reference diameter of the main and side branches was 3.0±0.4 mm and 2.0±0.2 mm respectively. Provisional T-stenting of the side branch was used in 86% of cases (side branch was stented in 11% of cases), systematic T stenting in 9% and V stenting in 5% of cases. In the provisional T-stenting group, all patients had final kissing balloon inflation after the stenting of the stent strut. Device success was obtained in all cases. Angiographic success was 100% and 97% for the main and the side branch respectively. In-hospital period was uneventful except for asymptomatic CKP elevation in one patient. Of the 28 patients who completed 6 month follow-up, there were no case of stent thrombosis, death or MI. Two patients had angiographic restenosis, first was local-in-stent restenosis of the main branch and the second, ostial restenosis of the unscaffolded side branch.

Conclusion: Implantation of the sirolimus-eluting stent at coronary bifurcations mainly using a strategy of provisional T stenting results in low clinical event rates. These preliminary results appear very promising. Six-month results of the total cohort will be presented at the meeting.

Low Repeat Revascularization Rates Following Drug-Eluting Stent Implantation in De Novo Bifurcation Lesions

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Background: Bifurcation lesions demonstrate high restenosis when treated with conventional stents. We evaluated both the sirolimus-eluting (SES) and paclitaxel-eluting stent (PES) in this high risk population.

Methods: Since April 2002, the default strategy at our institution was to use drug-eluting stents in all patients. In the 2nd quarter of 2003, we switched from SES to PES for all procedures. The current study evaluated 199 consecutive patients treated for de novo bifurcation stenoses with either SES (n=127) or PES (n=72) implantation into both main vessel and side branch. All were followed-up for clinical events, with additional angiography in those enrolled in the first 6 months.

Results: Presentation: stable angina 60%, acute myocardial infarction 12%. There were 5 subacute thromboses (2.5%), 4 in patients initially treated with AMI. A total of 228 lesions were treated. Target lesion revascularization rate was 7%, and target vessel revascularization (TVR) 9%. Follow-up angiography (in 70% of those eligible), revealed binary restenosis of 9% in the main vessel and 14% in the side branch. 5 of the 6 side branch restenoses were ostial and followed T-stenting. The stenting technique used is depicted in the figure. Further follow-up data of both periods will be available at the ACC. Conclusions: Both SES and PESs used for bifurcation lesions, demonstrate a low rate of TVR. Ensuring complete lesion coverage with drug-eluting stents may further reduce restenosis particularly at the ostium of the side branch.