betics and mean lesion length was 25.3±12.1 mm. Mean radiation dose was 21.5±2.3 Gy. According to the Mehran classification of in-stent restenosis only 4.7% represented focal lesions -10 mm of length (class I), 89.5% were diffuse lesions (class II to III), and 4.8% of the vessels were totally occluded (class IV). After 6 months all patients underwent angiographic follow up (AFU). Binary restenosis was observed in 21 (20%) patients. Analysis of the length of the remaining lesion in all patients yielded a significantly shorter lesion length at AFU. In those 20 patients with significant restenosis lesion length was also significantly reduced from 35.3±15.7 mm to 10.9±5.1 mm (p<0.01). In addition we observed a significant downgrading of the remaining lesions towards less diffuse and more focal lesions (class I 83.6%, class II-III 6.7%, class IV 4.7%; p<0.01).
Conclusion: IRT is a safe and effective tool for the treatment of diffuse in-stent restenosis, even in those cases with an apparent treatment failure, IRT leads to a shift in the pattern of recurrent stenosis towards a less diffuse and more focal stenosis which may be more suitable for the treatment with conventional interventional techniques.

1077-4 Effects of Geographic Miss During Intracoronary Brachytherapy on Edge Stenosis at Follow-Up

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Background: Previous studies have described intracoronary brachytherapy (ICB) to be an effective strategy for the reduction of instent restenosis. However, the occurrence of edge stenosis after ICB is still a limitation. A possible explanation might be by an insufficient irradiation of injured segments. This study aims to determine the effects of insufficient irradiation of injured segments during ICB on angiographic outcome at follow up (FUP).
Definition: Reference Isodose (RI): >90% of reference dose at 1mm vessel wall depth; no geographic miss (NGM): complete injured segment covered by RI; partial geographic miss (PGM): outmost 4mm of injured segment only partially covered by RI; geographic miss (GM): outmost 4mm not covered by RI.
Methods: Baseline angiograms of patients with instent restenosis undergoing coronary reintervention followed by ICB were analyzed. The distances between outmost reinterventional injury and outmost RI were measured. The median length of all misses (GM and PGM) was 4mm. Accordingly, FUP analysis (minimal lumen diameter [MLD] and percent diameter stenosis [DS]) was performed at the outmost 4mm segment within the injured segment in group NGM. In case of outmost RI shorter than the outmost injury (GM or PGM), analysis was performed at the segment between outmost RI and outmost injury, however at a segment of at least 4mm.
Results: Edge analysis was performed at 218 edges of 109 patients. FUP was available for 116 edges (FUP period: 6.9±2.3 months). 88 edges were irradiated with a beta source and 28 edges with a gamma source. GM was found at 16 (13.8%) edges, and PGM at 10 (8.6%) edges. FUP-MLD was 2.0±0.8, 1.8±0.7 and 1.4±0.7mm (p=0.02) in the groups NGM, PGM, GM, and FUP-DS 23.5±24.9, 33.8±19.5 and 40.0±27.4% (p=0.03) respectively. Posthoc Bonferroni analysis revealed significant differences between NGM and GM for both FUP-MLD (p=0.02) and FUP-DS (p=0.04).
Conclusion: Geographic miss and partial geographic miss are associated with a smaller minimal lumen diameter and a higher percent diameter stenosis at follow up at the site of the insufficient radiation. This effect was more pronounced in the GM-patient cohort.

1077-5 Effects of Debulking Before Intracoronary Beta-Radiation Therapy for Diffuse In-Stent Restenosis

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Background: The role of debulking before β-radiation therapy (RT) remains to be elucidated. We evaluated the clinical and angiographic outcomes after β-RT in patients (pts) with diffuse in-stent restenosis (ISR), with or without rotational atherectomy before irradiation.
Methods: Fifty consecutive pts were treated with ^{188}Re-MAG$_3$-filled balloon after rotational atherectomy and adjunctive balloon angioplasty (phase I). Another 50 consecutive pts were treated without prior atherectomy (phase II). The prescribed dose was 15Gy at 1mm deep into the tissue form balloon-artery interface.
Results: Baseline clinical characteristics were not different between 2 groups. Preliminary clinical and angiographic results were significantly better in pts with prior debulking before β-RT. Final results will be presented.
Conclusion: These results suggest that debulking before RT with ^{188}Re-MAG$_3$-filled balloon might improve the long-term clinical and angiographic outcomes in pts with diffuse ISR.

	Debulking + RT (n=50)	RT without debulking (n=50)	P value
Mean lesion length (mm)	25.3 ± 12.7	22.9 ± 8.6	0.007
Mean radiation length (mm)	37.6 ± 11.2	41.2 ± 10.3	NS
Distal reference diameter (mm)	2.89 ± 0.40	2.77 ± 0.48	0.157
Baseline MLD (mm)	0.60 ± 0.44	0.71 ± 0.37	0.170
Final MLD (mm)	2.68 ± 0.39	2.61 ± 0.44	0.363
6 months F/U MLD (mm)	2.31 ± 0.60	1.81 ± 0.92	0.001
Loss index	0.17 ± 0.31	0.41 ± 0.57	0.001
Restenosis rate	5/50 (10%)	14/33 (42%)	0.001
Death or MI	0	0	
Repeat revascularization	1 (2%)	6 (11%)	0.060

1077-23 Predictors and Prognostic Values of CK-MB Cardiac Enzyme Elevation After Coronary Intervention With Radiation Treatment in In-Stent Restenosis

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Background: Elevation of serum creatinine kinase-MB (CK-MB) after percutaneous coronary intervention (PCI) has been associated with increased mortality. We evaluated the predictors and prognostic values of CK-MB enzyme elevation after PCI plus radiation for in-stent restenosis.
Methods: All 350 patients who were randomized to gamma-radiation (Ir-192) treatment after successful PCI in the WRIST, GAMMA-I, GAMMA-II and SCRIPP-III were included for the analysis. Patients were divided into 3 groups: CK-MB ≥3 times normal (N=61), CK-MB <3 times normal (N=53), and no CK-MB elevation (N=236).
Result: Baseline clinical characteristics were similar among the groups except for diabetes (Table).
Conclusion: Post-procedural CK-MB elevation after radiation correlates with diabetes, long lesion length and long seed length of radiation source. CK-MB elevation is associated with higher in-hospital complications and trend toward higher late thrombosis at 6 months follow-up.

	CK-MB ≥3 times (n=61)	CK-MB <3 times(n=53)	No CK-MB Elevation(n=236)	P-Value
Diabetes (%)	42.6%	49.1%	30.0%	0.01
Ref. vessel diameter (mm)	2.6 ± 0.5	2.7 ± 0.3	2.7 ± 0.5	0.6
Lesion length (mm)	32.4 ± 19.4	21.7 ± 15.4	25.5 ± 12.7	0.0013
Seed length (mm)	55.2 ± 17.2	47.4 ± 17.6	45.2 ± 13.9	<0.0001
Final MLD (mm)	2.1 ± 0.5	2.3 ± 0.4	2.1 ± 0.5	0.01
Atheroablation (%)	26.7%	26.4%	35.4%	0.2
In-hospital MACE (%)	31.0%	8.1%	16.2%	0.02
MACE at 6 months (%)	28.8%	26.9%	19.3%	0.1
TVR at 6 months (%)	13.6%	25.0%	17.6%	0.2
Death at 6 months (%)	1.7%	3.9%	1.7%	0.5
Late thrombosis (%)	6.8%	2.0%	1.7%	0.09

1077-24 Intracoronary Brachytherapy for In-Stent Restenosis: Eliminating the Side Branches?

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Background: Intracoronary radiation therapy (IRT) has proven to be highly effective for the prevention of recurrent stenosis after percutaneous intervention of in-stent restenosis. Nevertheless, while the longitudinal dose fall-off in combination with tissue injury may increase the restenosis rate in the main vessel, the lateral dose fall-off may especially affect sidebranches of the treated vessel. This phenomenon appears not to take place in major sidebranches, but has been so far not investigated for small branches which may be more likely affected and may then result in a rarefication of the coronary system.
Methods and Results: 68 consecutive patients who underwent PTCA and adjuvant IRT for in-stent restenosis were included. Mean age was 58.1±11.4 years, 13.1% were diabetics and the mean lesion length was 27.3±15.1 mm. Mean radiation dose was 21.5±2.2 Gy. In these patients all visible sidebranches in the irradiated segment ±10mm were analysed visually for patency and ostial stenosis immediately after the intervention and at the 6 months angiographic follow up. A range of 3 to 6 sidebranches was analysed per patient. After 6 months one vessel with a prior very diffuse lesion was totally occluded. In the other cases none of the sidebranches in the analysis were affected or even showed a significant narrowing in the proximal part.
Conclusion: The present data do not support the hypothesis that in sidebranches of the treated vessel the combination of tissue injury together with the radiation dose fall-off leads to deleterious effects that result finally in a rarefication of the coronary vascular system. This finding underlines that IRT is a safe and effective tool for the treatment of in-stent restenosis.

1077-25 Intracoronary Ultrasound Assessment of Intermediate Coronary Lesions: Comparison With Pressure-Derived Fractional Flow Reserve

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Background: The criteria for the severity of stenosis in intracoronary ultrasound (ICUS) have not been objectively defined. However, ICUS-derived minimal luminal cross-sectional area (LAmin,mm^2) >4.0 is widely used as the cut-off value for deferral percutaneous coronary intervention in patient with intermediate coronary lesion (IML). Pressure-derived fractional flow reserve (FFR) <0.75 is strongly related to inducible myocardial ischemia. The aim of the study was to evaluate the usefulness of ICUS assessment of IML in comparison to FFR. Methods: In 56 patients (pts) with IML (Diameter stenosis (DS) =40-60% by QCA) FFR was calculated after intracoronary injection of adenosine (40-80μg for the left coronary artery, 15-30μg for the right). Than, in all lesions ICUS was performed using automated pull-back (0.5mm/sec) to calculate LAmin and the lesion length (LL,mm). According to FFR pts were divided into two groups: Group 1: FFR≤0.75