9:45

781-6 Role of Coronary Angioplasty (PTCA) on Neutrophil, Monocyte and Platelet Activation and Adhesion Molecule Surface Expression

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Endothelial injury and/or repeated ischemia/reperfusion episodes during PTCA may induce cell activation as well as affect the surface expression of adhesion molecules (AM) such as CD18, CD11b, L-selectin (neutrophil, PMN), CD14 (monocyte), and GPIIb/IIIa (platelet). We determined cellular AM expression (flow cytometry, fluorescence intensity) and superoxide generation (cytochrome *c* reduction, nmol/10^6 cells) and aggregation (amplitude, cm/min) of *ex vivo* phorbol ester-stimulated PMNs of stable angina patients who underwent PTCA. All patients were on aspirin. Blood samples were collected simultaneously from aorta and coronary sinus (CS) before and 1 and 15 min after PTCA. Balloon size and pressure were 2.0 ± 4.0 mm diameter and 3.5 ± 8.0 atm, respectively. Total inflation time was 290 ± 20 sec.

Coronary stenosis decreased from 82 ± 2% to 36 ± 3% after PTCA ($P \leq 0.001$). Results (see Table) are expressed as % changes of CS-aorta parameters.

	Before	1 Min	15 Min
CD18 (N = 10)	102 ± 3	111 ± 11	189 ± 13*
CD11b (N = 10)	105 ± 8	113 ± 14	163 ± 16*
L-selectin (N = 10)	96 ± 4	61 ± 7*	31 ± 6*,†
CD14 (N = 10)	102 ± 8	112 ± 9	158 ± 12*
GPIIb/IIIa (N = 9)	95 ± 5	116 ± 15	141 ± 15*
Superoxide (N = 13)	103 ± 5	73 ± 8*	54 ± 9*,†
Aggregation (N = 13)	104 ± 7	65 ± 6*	58 ± 4*

Mean ± SEM. $P \leq 0.05$: *CS *vs* aorta, †*vs* 1 Min.

These data indicate that superoxide generation and aggregation significantly decreased in stimulated PMNs suggesting *in vivo* activation. Thus, PTCA markedly induces PMN activation and hyperaggregability and affects the surface expression of the AMs Mac-1 (CD11b/CD18), L-selectin, CD14, and GPIIb/IIIa.

782 New Insights Into Optimal Atherectomy

Wednesday, March 27, 1996, 10:30 a.m.–Noon
Orange County Convention Center, Room 209

10:30

782-1 Early and Late Quantitative Angiographic Outcomes in the Optimal Atherectomy Restenosis Study (OARS)

Jeffrey J. Popma, Donald S. Baim, Richard E. Kuntz, Gary S. Mintz, Charles Simonton, Tomaki Hinohara, J. Hope Pacera, Cindy Senerchia, Anand Desai, Martin B. Leon, for the OARS Investigators. *Washington Hospital Center, Washington, DC*

"Conservative" DCA results in a moderate angiographic restenosis rate (CAVEAT: 50%), marginally lower than that noted after standard PTCA (CAVEAT: 57%). To assess the early and late quantitative angiographic outcomes in patients undergoing "optimal" (< 10% visual stenosis) intravascular ultrasound-guided DCA, we reviewed the cine-angiograms of 199 patients (211 lesions) undergoing this procedure. All cineangiograms were reviewed using standard qualitative morphologic and quantitative angiographic methods (CMS: interpolated normal). Late (6 month) angiographic follow-up was available in 82% of patients. Minimal lumen diameter = (MLD).

Angiographic findings	Reference diameter (mm)	MLD (mm)	% Diameter stenosis
Pre	3.28 ± 0.46	1.19 ± 0.42	64 ± 11
Post DCA	3.38 ± 0.46	2.73 ± 0.67	19 ± 18
Final	3.41 ± 0.46	3.15 ± 0.50	7 ± 11
Follow-up	3.20 ± 0.45	1.99 ± 0.82	38 ± 22

Overall, acute gain after "optimal" DCA was 1.96 mm; 24% was contributed by adjunct PTCA. Angiographic complications included: perforation, 0.9%; dissection (≥ Grade C), 1%; and in-lab closure, 1%. Binary restenosis, defined as ≥ 50% follow-up diameter stenosis, developed in 30% of lesions. *We conclude* that "optimal" DCA using ultrasound guidance results in (1) a low residual % diameter stenosis immediately after the procedure with infrequent (2%) major angiographic complications and (2) sustained late angiographic benefit with a 30% incidence of angiographic restenosis at late follow-up.

10:45

782-2 Mechanism of Luminal Enlargement by Optimal Atherectomy — IVUS Insights From the OARS Study

Donald S. Baim, Charles A. Simonton, Jeffrey J. Popma, Tomaki Hinohara, Robert M. Bersin, Tia DeFeo, Kenneth M. Kent, Paul G. Yock, Richard E. Kuntz for the OARS Investigators. *Harvard Medical School, Boston, MA; Beth Israel Hospital, Boston, MA*

Serial intravascular ultrasound was performed at baseline, following atherectomy (DCA), and following Post Dilation in 161 lesions (151 pts) enrolled in the Optimal Atherectomy Restenosis Study (OARS):

	Pre	Post DCA	Post PTCA
QCA Ref dia (mm)	3.28 ± 0.46	3.38 ± 0.46	3.41 ± 0.47
Lesion dia (mm)	1.19 ± 0.42	2.73 ± 0.67	3.15 ± 0.51
(% diameter sten)	63.6 ± 11.4	18.9 ± 18.0	7.5 ± 10.8
IVUS Ref lumen CSA	10.09 ± 3.29	10.88 ± 3.77	11.10 ± 4.00
Lesion lumen CSA	1.97 ± 1.26	7.63 ± 2.13	8.75 ± 2.39
Lesion Plaque area	16.69 ± 5.00	12.76 ± 4.78	12.45 ± 4.63
Lesion EEM CSA	18.59 ± 5.29	20.47 ± 5.92	21.15 ± 6.11

Optimal atherectomy was able to achieve a final lumen diameter of 3.15 mm (7.5% stenosis) and a 8.75 mm^2 CSA by IVUS (18.3% area stenosis relative to the reference segment), despite the remaining 57.9% plaque burden relative to the lesion EEM area. Tissue removal (change in lesion plaque area, 3.93 mm^2) contributed 58.0% of the final increase in lumen CSA, with an additional 25.5% increase from mechanical "Dotter" during DCA and 16.5% from Post dilation.

In conclusion: 1) Optimal atherectomy is able to achieve excellent lumen enlargement despite removing < 50% of the plaque mass. 2) Although tissue removal explains 58.0% of the lumen increase, mechanical dilation increases the outer diameter of the vessel, and explains the rest (including a 16.5% incremental contribution from Post dilation). 3) Follow-up data will address whether the amount of tissue removed (as well as the final lumen diameter) influences subsequent restenosis.

11:00

782-3 Optimal Burr and Adjunctive Balloon Sizing Alters the Need for Target Vessel Revascularization After Rotablator Atherectomy

Barry M. Kaplan, Jon J. Mojares, Robert D. Safian, Venu M. Reddy, William W. O'Neill. *William Beaumont Hospital, Royal Oak, Michigan*

Clinical followup (17 ± 4 months) was obtained in 309 patients (337 lesions) treated with rotational atherectomy (MRA) from August 1993 to September 1994 to determine whether procedural results or technique were related to the need for target vessel revascularization (TVR). Mean age was 65 ± 12 years and 64% were male and 36% female. TVR defined as repeat percutaneous intervention or bypass surgery within 6 months after MRA occurred in 18%. Quantitative angiographic analysis demonstrated that smaller residual post MRA diameter stenosis (DS) was associated ($p < 0.03$) with smaller final DS after adjunctive PTCA. Larger burr/artery ratios (Burr/A) defined as the final burr size divided by the reference artery size were correlated with decreased post MRA DS ($p < 0.009$) and decreased final DS ($p < 0.03$). However, there was no statistical association between post MRA or final DS with need for TVR. The need for TVR was lowest for Burr/A between 0.6–0.85 (TVR = 15%) vs. Burr/A < 0.6 or > 0.85 (TVR = 25%) ($p < 0.04$). Post MRA, smaller balloon/artery ratios (Bal/A) defined as the final balloon size divided by the reference artery size were correlated with lower TVR. The mean Bal/A in the no TVR group was 0.92, compared to 1.04 in the TVR group ($p < 0.003$). Bal/A ratios < 0.95 (TVR = 11% vs. 25% in Bal/A > 0.95) were correlated with the best luminal results and least risk for TVR ($p < 0.006$).

Conclusions: For MRA, despite improvement in acute luminal results with increased Burr/A, the use of a moderate Burr/A correlated with the lowest TVR rates. There was no correlation between post MRA or final diameter stenosis and need for TVR. The use of large Bal/A after rotablator was associated with higher TVR rates. Therefore, the use of a Burr/A of 0.60–0.85 and a Bal/A of < 0.95 is recommended. Significant under or oversizing of the burr and/or oversizing of the balloon appear to increase repeat revascularization rates.