Serum from patients with restenosis after PTCA stimulates proliferation of bovine vascular smooth muscle cells under low extracellular calcium condition.

M. Shirotani, Y. Yui, R. Hattori, M. Takahashi, T. Aoyama, Y. Murohara, H. Morishita, K. Kadota, and C. Kawai. Third Division, Department of Internal Medicine, Faculty of Medicine, Kyoto University, Kyoto, JAPAN.

We compared the effects of serum on the proliferation of bovine vascular smooth muscle cells (VSMC) between patients with and without restenosis (groups RS+ and RS-, respectively) after successful PTCA. Cultured quiescent bovine VSMC were stimulated with patients' serum (5%) obtained at follow-up angiography in both Ca^{2+}-containing and Ca^{2+}-free media (Ca_+ and Ca_-, respectively). [^{3}H]thymidine uptake was measured and the following indices of VSMC proliferation were used: S(+)= [^{3}H]thymidine uptake by 5% serum in Ca_+/[^{3}H]thymidine uptake by 5% fetal calf serum (FCS) in Ca_+, S(-)= [^{3}H]thymidine uptake by 5% serum in Ca_-/[^{3}H]thymidine uptake by 5% FCS in Ca_-, and D=S(-)-S(+).

	n	S(+)	S(-)	p value	
RS+	21	1.50±0.58	1.64±0.66	0.010	
RS-	34	1.57±0.58	1.35±0.56	<0.0001	(M±SD)

D, which represents the preserved DNA synthesis in Ca_-, was significantly higher in RS+ (0.14±0.23 vs -0.22±0.28, p<0.0001). D was not associated with serum calcium level. Multivariate analysis revealed unstable angina as an only independent variable for D. Thus, it is suggested that serum from patients with restenosis stimulates VSMC proliferation nor requiring as much extracellular Ca^{2+} as serum from those without restenosis and this serum property appears to be associated with angina pattern at PTCA.

Presenter's address: 3rd Division, Department of Internal Medicine, Faculty of Medicine, Kyoto University, 54 Kawara-cho Shogoin Sakyo, Kyoto, 606, Japan.

Immunocytochemical Analysis of the Cellular Composition of Fibrocellular Tissue Response Following PTCA

Makiko Ueda, Hideki Wanibuchi, Takahiko Naruko, and Toyohiro Tsukada

The Departments of Pathology and Internal Medicine, Osaka City University Medical School, Osaka and the Department of Internal Medicine, Sanraku Hospital, Tokyo

Restenosis following successful percutaneous translusina. coronary angioplasty (PTCA) is caused by a fibrocellular tissue response in the majority of cases. We have performed immunocytochemical investigations of the cellular components of the fibrocellular tissue response in five coronary arteries from four patients. Interval between PTCA and death in these patients ranged from 29 days to 19 months. Monoclonal antibodies used for the present study were as follows: anti-muscle actin antibody, HHF35[Tsukada et al. Am J Pathol 1987, 128: 51-60]; anti-smooth muscle actin antibody, 1A4[Gown et al. J Cell Biol 1985, 100: 807-813]; anti-macrophage antibody, HAM56[Gown et al. Am J Pathol 1986, 125: 191-207]; anti-vimentin antibody; anti-desmin antibody; and anti-FⅧ-Rag antibody. All the dilated arterial segments revealed lacerations extending into the media. The cells involved in producing the proliferation at the site of medial injury showed the immunophenotypic characteristics of smooth muscle cells. Moreover, smooth muscle cells in the fibrocellular tissue showed an initial absent reactivity with one of the anti-actin antibody(1A4), which became positive in more advanced lesions with restoration of the endothelial lining. These findings suggest that human vascular smooth muscle cells also exhibit alteration in actin expression which may be related to proliferation activity.

Presenter's address: Makiko Ueda, MD, Department of Pathology, Osaka City University Medical School, 1-4-54, Asahi-machi, Abeno-ku, Osaka 545 Japan.

Subintimal Tissue Resection and Restenosis After Directional Coronary Atherectomy

Kirk N. Garratt, M.D., David R. Holmes Jr., M.D. John F. Bresnahan, M.D., Malcolm R. Bell, M.B., B.S., William D. Edwards, M.D. Mayo Clinic, Rochester, Minnesota

The extent of vascular tissue resected during directional coronary atherectomy (DCA) was correlated with the frequency of angiographic restenosis (loss of 50% initial gain or lesion > 50%) six months after DCA in 70 patients (53 males, 74 lesions). There were 59 coronary artery (CA) and 15 saphenous vein graft (SVG) lesions treated; 37 were primary atheromatous lesions and 37 were post-balloon angioplasty restenosis lesions. Overall, restenosis occurred in 34 (50%) of 74 lesions and 36 (51%) of 70 patients. The rate of restenosis per lesion after intimal or subintimal tissue resection is displayed below:

	Intimal	Subintimal	p value
CA	15/30	14/29	NS
SVG	4/7	8/8	0.05
All lesions:			
Primary	3/18	8/19	NS
Restenosis	6/19	14/18	0.01

Conclusions: Angiographic restenosis may occur in 50% of lesions and 51% of patients following directional coronary atherectomy. Subintimal tissue resection appears to be associated with increased restenosis in saphenous vein graft lesions and post-balloon angioplasty restenosis lesions, but not in native coronary arterial lesions or primary atheromatous lesions.

Presenter's address: Kirk N. Garratt, MD, Cardiac Catheterization Lab, Mayo Clinic, Rochester, Minnesota 55905.

Morphological Features of 42 Coronary Arteries after Percutaneous Transluminal Coronary Angioplasty(PTCA): Emergency vs Elective.

Masakiyo Nobuyoshi, Takeshi Kimura, Hideyuki Nosaka, Hisanori Horiuchi, Hiroto Ohishi, Kokura Memorial Hospital, Kitakyushu, 802, Japan

To evaluate morphological difference between emergency and elective PTCA, 28 patients (pts) with 42 coronary arteries were analyzed pathologically. Interval from PTCA to death was 7 hours to 4 years. Pts were subdivided into 2 subgroups according to the clinical situation before PTCA. Group I: Acute myocardial infarction (AMI); 8 pts 8 lesions, Group II: Elective PTCA; 20 pts 34 lesions.

Morphology	Group I	GroupII
Tear	8(100%)	30(80%)
Central (plaque rupture)	8(100%)	5(15%)
Peripheral	2 (25%)	28(82%)
Thrombus	7 (88%)	8(24%)
Intimal hematoma	8(100%)	7(21%)
Smooth muscle cell proliferation	0 (0%)	28(82%)
Underlying lesion		
Atheromatous	8(100%)	14(41%)
Fibrous	0 (0%)	13(38%)
Mixed	0 (0%)	7(21%)

Ruptured atheromatous plaque with thrombus formation was a common morphological feature in pts with AMI as compared with peripheral tear with SMC proliferation in pts with elective PTCA. This finding gives pathological background of the reports demonstrating higher rate of early reocclusion and less late restenosis in PTCA for AMI.

Presenter's address: Masakiyo Nobuyoshi, MD, FACC, Department of Cardiology, Kokura Memorial Hospital, 1-1 Kifune-machi, Kokurakita-ku, Kitakyushu 802, Japan.