imaging and digitization performed over a 2 sec period. Mean videointensity in the balloon cross-sectional area was measured for every consecutive digitized image. *Results:* (1) Videointensity was found to be directly related to temperature induced changes in microbubble volume. (2) Under continuous ultrasonic irradiation, videointensity decreased over time. The slope of this decrease, defined as destruction index, correlated with both transmitted power and temperature, reflecting the destructive effects of irradiation, which were more pronounced at higher temperatures.

Conclusion: Temperature is a major factor affecting stability and reflectivity of Albunex® microspheres. To improve the reproducibility of contrast enhancement, the temperature of the contrast media should be carefully controlled.

972 Experimental Myocardial Ischemia/Infarction

Tuesday, March 21, 1995, 3:00 p.m.–5:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: 4:00 p.m.–5:00 p.m.

972-101 Cytokine Antagonists Increase in the Circulation During Myocardial Ischemia and Reperfusion

Maddalena Lettino, Anna Catania, Lorena Airaghi, Maria Grazia Manfredi, James M. Lipton [1]. *Ospedale Maggiore di Milano, Milano, Italy;* [1] *UT Southwestern Medical Center, Dallas, TX*

In the present research, we tested the idea that cytokine antagonists are released during acute myocardial ischemia and reperfusion to counteract pro-inflammatory effects of cytokines. We investigated changes in plasma concentrations of the anti-cytokine molecules α-melanocyte stimulating hormone (α-MSH), interleukin-1 receptor antagonist (IL-1 ra), and soluble tumor necrosis factor receptor (s TNF r) in patients with acute myocardial infarction (AMI) or unstable angina (UA) treated with thrombolytic agents compared to patients who did not receive thrombolysis. The study includes 32 pts presenting with prolonged chest pain and ST-segment changes on ECG; the final diagnosis was AMI in 24 and UA in 8 patients; 26 pts received thrombolytic therapy. There was no difference in the duration of chest pain at presentation between the thrombolysis and no thrombolysis groups. Blood samples were collected at admission in the CU and at 3 h intervals for 24 h. Comparisons of plasma α-MSH concentrations in thrombolysis and untreated groups showed highly significant differences: whereas concentrations of the peptide were elevated in early samples of patients treated with a thrombolytic agent, they were consistently low in untreated subjects. IL-1 ra levels were likewise greater 3 and 6 h post treatment in patients who underwent thrombolysis, whereas there was no significant difference for plasma s TNF r between the two groups. We suggest that during myocardial ischemia and reperfusion anti-cytokine molecules released within the injured myocardium reduce inflammation caused by cytokines and other mediators of inflammation.

972-102 Suppression of ICAM-1 and P-Selectin Adhesion Molecule Expression by Bolus IV Liposomal PGE_1 (TLC-C53) Immediately Prior to Reperfusion in a Two Hour Canine Infarct/Reperfusion Model

Richard Smalling, Margaret Uthman, Nagendra Ramanna, Edward Yeh, James Amirian, Patty Felli, Steve Feld, Michel Accad, Andrew Concoff, C. Wayne Smith, Mark Entman, Andrew Janoff. *U. T. Medical School and Baylor College of Medicine, Houston, Texas*

Bolus administration of 2 μ/kg Liposomal PGE_1 (TLC-C53) after 2 hrs of ischemia inhibits WBC accumulation into ischemic tissue and significantly reduces infarct size upon reperfusion. To test the hypothesis that inhibition of adhesion molecule expression was the mechanism of this observation we studied 11 dogs subjected to 2 hrs of ischemia followed by 3 hrs of reperfusion. Animals were randomly assigned to receive either placebo or 2 μ/kg TLC-C53 just prior to reperfusion. Samples obtained from the coronary sinus at baseline and at various intervals throughout the experiment were analyzed for expression of L-Selectin (CL2) and CD11b (MY 904) on WBC using indirect immunofluorescence and flow cytometry. After sacrifice, tissue samples obtained from the infarct, border, risk and control regions were analyzed for WBC infiltration (myeloperoxidase) and expression of ICAM-1 (CL18) and P-Selectin (MD3) on the endothelium using immuno-histochemistry. Intensity of staining was graded from 0 (no stain) to 3 (intense stain).

Results: No differences in WBC mean channel fluorescence between the treatment and control groups could be detected for either L-Selectin or CD11b. Risk region expression of ICAM-1 was reduced from 2.6 ± 0.6 to 0.9 ± 0.6 ($p < 0.001$) and P-Selectin from 1.6 ± 0.6 to 0.9 ± 0.8 ($p < 0.01$). Infarct zone myeloperoxidase was reduced from 0.28 ± 0.1 to 0.1 ± 0.1 U/100 mg ($p = 0.03$).

Conclusion: Bolus IV administration of TLC-C53 at reperfusion suppresses expression of ICAM-1 and P-Selectin on ischemic but viable endothelium and prevents secondary (presumably lethal) WBC myocardial infiltration. The effect of TLC-C53 on WBC adhesion molecule expression may be less marked. We propose that inhibition of adhesion molecules in ischemic myocardium is the principle mechanism of infarct salvage by TLC-C53.

972-103 A Monoclonal Antibody Directed Against ICAM-1 Reduces Myocardial Stunning Following Ischemia and Reperfusion

David J. Lefer, David M. Flynn, Scott Morehouse, Khoa D. Vo, Andrew J. Buda. *Tulane University School of Medicine, New Orleans, LA*

Previous studies have demonstrated that monoclonal antibodies (MAbs) that neutralize ICAM-1 reduce myocardial necrosis following ischemia and reperfusion. We investigated the effects of a MAb directed against rat ICAM-1 (1A29) in a rat model of myocardial reperfusion injury. Isolated, Krebs buffer perfused rat hearts (n = 7/group) were subjected to 20 min of global ischemia followed by 45 min of reperfusion. Forty million human neutrophils (PMNs) and 5 cc of rat plasma were infused into each heart during the first 5 min of reperfusion. Immunohistochemical staining of ischemic-reperfused myocardium revealed prominent endothelial ICAM-1 expression and PMN accumulation in coronary arterioles and venules in untreated hearts. In addition, left ventricular developed pressure (LVDP), pressure-rate product (PRP), and coronary flow (CF) were measured at baseline and at 5 minute intervals throughout the 45 min reperfusion period. When compared to control hearts receiving human PMNs and rat plasma alone, treatment with 1A29 (300 μg/heart) significantly ($p < 0.01$) enhanced recovery of LVDP after 45 min of reperfusion (90.8 ± 12.7% vs. 42.8 ± 5.5%). The recovery of PRP at 45 min of reperfusion was 89.7 ± 15.6% in 1A29 treated hearts compared to 42.2 ± 5.3% in the control hearts ($p < 0.02$). Furthermore, treatment with 1A29 significantly preserved CF at 45 min of reperfusion (73.9 ± 5.3% vs. 48.9 ± 6.9%, $p < 0.05$). Histological analysis of hearts receiving 1A29 demonstrated a significant reduction in PMN accumulation. We conclude that inhibition of ICAM-1 mediated PMN adhesion in the initial phase of reperfusion significantly attenuates neutrophil induced postischemic myocardial contractile dysfunction.

972-104 Diagnostic Ability of a Single Admission Value of Serum Myoglobin, Troponin-T and CK-MB in Acute Myocardial Infarction Patients

Birgit Jurlander, Peter Clemmensen, Søren Galatius-Jensen, Galen S. Wagner, Peer Grande. *Department of Medicine B, Rigshospitalet and Hillerød Sygehus, University of Copenhagen, DK; Division of Cardiology, Duke University, N.C.*

Admission serum myoglobin (Mb) and troponin-T (TNT) levels were evaluated vs admission CK-MB (mass assay) levels and the admission ECG ST elevation (ST↑) >2 m V, for their diagnostic values in patients with suspected acute myocardial infarction (AMI) before thrombolytic treatment.

Consecutive patients (n = 153), presenting with chest pain at rest >30 min but <12 hrs, unresponsive to nitroglycerin, were included. The ultimate diagnosis of AMI was based on a rise and fall pattern of CK-MB (catalytic assay) and a peak value >15 U/l, and/or the development of Q-waves on the ECG.

	AMI (n = 81) (median (95% CI))	No-AMI (n = 72) (median (95% CI))	p
minutes to admission	179.6 (100–210)	179.7 (105–240)	NS
admission Mb (μg/l)	123.0 (79.9–154.0)	46.2 (40.0–50.6)	<0.00001
admission TNT (μg/l)	0.082 (0.03–0.15)	0.003 (0.00–0.01)	<0.00005
admission CK-MB (μg/l)	5.4 (3.6–7.6)	1.85 (1.4–2.6)	<0.00001
admission ECG (ST↑)	n = 50	n = 9	<0.00005

The admission Mb, TNT and CK-MB concentrations were significantly higher in the AMI patients compared to the No-AMI patients, and there was no overlap of the 95% CI of the medians between the two groups. For AMI diagnosis, the predictive values of positive and negative tests were 0.84 and 0.62 for Mb >110 μg/l; 0.70 and 0.62 for TNT >0.02 μg/l; 1.00 and 0.53 for CK-MB >9.5 μg/l, and 0.85 and 0.67 for the ECG ST↑.

Conclusion: A rise in serum Mb and TNT at admission, even below the usual diagnostic cut-off values for AMI diagnosis, has an acceptable diagnostic accuracy. For more prompt and widespread use of fibrinolytic therapy we propose a lowering of the diagnostic cut-off values for serum Mb, TNT and CK-MB for admission diagnosis of MI.