Single center registries have shown that distal protection with the Medtronic (Percu-Surge) GuardWire balloon occlusion and aspiration system is capable of retrieving embolic particulate debris in a large percentage of patients undergoing primary PCI. Whether this translates into improved reperfusion success and enhanced outcomes has not been determined.

Methods. In the EMERALD trial, 500 pts within 6 hrs onset of chest pain with ≥ 2 mm ST elevation in 2 or more contiguous leads, or LBBB, undergoing primary or rescue PCI are being prospectively randomized at 40 sites to angioplasty with vs. without distal protection with the 0.028" GuardWire Plus system. The primary endpoints include STR 30 mins post procedure (measured by 24 hour continuous ECG monitoring) and infarct size assessed by tc-99m-sestamibi imaging at day 5-14. The study is powered to show an improvement in complete STR from 50% with control to 65% with distal protection (a 30% relative increase), and a reduction in mean infarct size from 13.1% of the left ventricle to 8.8%. (a 33% relative decrease). Secondary efficacy endpoints include achievement of normal (grade 3) myocardial blush by core lab analysis, and the composite clinical rate of death, new onset sustained hypotension or severe heart failure, and readmission for left ventricular failure within 30 days.

Results. To date, more than 415 pts have been randomized; enrollment will be complete by November 2003.

Conclusions. A large-scale, prospective, randomized multicenter trial has been performed to: 1) Examine whether prevention of distal embolization in patients undergoing primary PCI for AMI improves indices of myocardial reperfusion and resolution of ongoing injury, reduces infarct size and improves clinical outcomes, and 2) Evaluate the safety, feasibility and efficacy of the GuardWire balloon occlusion and aspiration system for this application. The principal results will be reported for the first time in March 2004.

5:15 p.m.

829-6   A Randomized Trial Comparing Rheolytic Thrombectomy Before Infarct Artery Stenting With Stenting Alone in Patients Undergoing Percutaneous Coronary Intervention for Acute Myocardial Infarction

Guido Parodi, Renato Valenti, Angela Migliorini, Gentian Memisha, Emilio V. Dovellini, Giampaolo Cerisano, David Antoniucci, Careggi Hospital, Florence, Italy

Background Macro and microembolization of atherothrombotic debris during percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI) are frequent and may result in the obstruction of the microvessel coronary network and decrease in effectiveness of mechanical reperfusion.

Methods This randomized trial compared rheolytic thrombectomy before direct infarct artery stenting with direct infarct artery stenting alone in 100 patients with a first AMI. The effectiveness of reperfusion was assessed by analysis of ST-segment resolution at 30 min after infarct related artery (IRA) recanalization, by corrected TIMI frame count (cTFC), and by 1-month ^{99m}Tc-Sestamibi scintigraphy infarct size. The primary end point of the study was early ST-segment resolution, and the secondary end points were cTFC, infarct size, and 1-month clinical outcome.

Results There were no significant differences between randomized groups in baseline characteristics. Most patients had abciximab treatment (98%) and IRA stenting (98%). Among direct stenting alone group the cross over to thrombectomy was 8% and was due to residual angiographic evidence of massive thrombosis after stenting. Thrombectomy catheter could successfully cross the lesion before stenting in 96% of patients. The primary end point rate was 90% in the thrombectomy group, and 72% in the direct stenting alone group (p=0.022). At multivariate logistic regression analysis, randomization to thrombectomy was related to the primary end point (OR: 3.56; 95% CI: 1.11-11.42; p = 0.032). cTFC was lower in the thrombectomy group (18.2 ± 7.7 vs 22.5 ± 11.0; p=0.032), and infarct size smaller in the thrombectomy group (13.0 ± 11.6% vs 21.2 ± 18.0%; p=0.010). At 1 month, there were no major cardiac adverse events in both groups.

Conclusions Rheolytic thrombectomy before routine direct IRA stenting is highly feasible and provides a more effective myocardial reperfusion in patients undergoing PCI for AMI.

ORAL CONTRIBUTIONS

833

Adjunctive Medical Therapy for Acute Myocardial Infarction

Tuesday, March 09, 2004, 8:30 a.m.-10:00 a.m.
Morial Convention Center, Room 260

8:30 a.m.

833-1   Use of Angiotensin-Converting Enzyme Inhibitors After Acute Myocardial Infarction Is Associated With a Striking Reduction in 30-Day and One-Year Mortality: Insights From GUSTO V

Deepak P. Vivekananthan, A. Michael Lincoff, Hitinder S. Gurm, Danielle Brennan, Eric J. Topol, Cleveland Clinic Foundation, Cleveland, OH

Background: The use of angiotensin converting enzyme inhibitors (ACE-I) has been shown to provide a reduction in mortality in high-risk patients after myocardial infarction (MI). However, the benefit of routine administration of ACE-I in lower risk MI patients after fibrinolytic therapy has not been well studied.

Methods: We used data from the GUSTO V trial to compare all-cause mortality among patients who received ACE-I (n=9352) between 24 hours of trial enrollment and hospital discharge and those who did not receive ACE inhibitors (n=6867) within this time frame. Use of ACE-I was left to discretion of the treating physician. We performed a propensity analysis to fully adjust for selection bias in the prescription of ACE-I.

Results: Patients prescribed ACE-I tended to be older and had a higher percentage of diabetes, anterior wall MI, and history of hypertension. The incidence of prior congestive heart failure (CHF) was low in both groups (<4%). Over 96% of patients in both groups were Killip 1 or 2. There were 587 deaths (3.5%) at 30 days and 1021 deaths (6.3%) at one year. Despite a higher risk factor profile, patients prescribed ACE-I had a lower mortality at 30-days (2.8% vs. 4.8%, p<0.001) and one-year (5.7% vs. 7.1%, p<0.001). After adjusting for the propensity to receive ACE-I and known confounders, the prescription of ACE-I was associated with a significant decrease in 30-day mortality (OR 0.43; 95% CI 0.34 - 0.53, p<0.001).

Conclusions: In-hospital initiation of ACE-I after fibrinolytic therapy for acute MI, even in lower-risk patients, is associated with a dramatic reduction in short-term and long-term mortality. This study adds to the growing evidence supporting the routine use of ACE-I in all patients with acute myocardial infarction.

8:45 a.m.

833-2   Long-Term Effects of Statin Therapy in Patients With Acute ST-Elevation Myocardial Infarction and Moderate or Severe Left Ventricular Dysfunction: Reduction of Mortality but Not of Nonfatal Major Adverse Coronary and Cerebrovascular Events

Thomas Kleemann, Rudolf Schiele, Anselm Gitt, Claus Jünger, Harm Wienbergen, Jochen Senges, Bernhard Rauch, The MITRA PLUS Study Group, Herzzentrum Ludwigshafen, Ludwigshafen, Germany

Background: Different randomized clinical trials have shown that statins reduce mortality and major adverse coronary and cerebrovascular events (MACCE) in the setting of acute myocardial infarction. These trials had focused mainly on patients (P) with preserved or slightly reduced left ventricular function. **Aim of the study** was to evaluate the prognostic impact of statin therapy in P with ST elevation acute myocardial infarction (STEMI) and moderate or severe left ventricular dysfunction (LVD). **Patients and methods:** 1402 consecutive P with acute STEMI and a LVD (ejection fraction < 40%) of the prospective multicenter registry Maximal Individual Therapy of Acute Myocardial Infarction PLUS (MITRA PLUS) were analyzed. 1034 (74%) P received statin therapy. **Results:** After a median follow-up time of 399 [353-574] days, the all-cause mortality of P not receiving statin therapy was more than twice as high as in P receiving statin therapy (26.9% versus 12.6%, p< 0.0001).

Conclusion: 1. In P with acute STEMI and moderate or severe LVD statin therapy was associated with a 36% reduction of long-term mortality. 2. In contrast to previous clinical trials performed in P with preserved or slightly decreased LVD, statins did not reduce nonfatal MACCE in P with moderate or severe LVD.

Multiple logistic regression of outcome: statin versus no statin in acute STEMI and LVD

	Odds ratio	95% Confidence interval
Long-term mortality	0.64	0.45 - 0.90
Nonfatal reinfarction	1.15	0.52 - 2.55
Nonfatal stroke	0.53	0.19 - 1.44
CABG	1.07	0.62 - 1.83
PTCA	0.88	0.50 - 1.53

9:00 a.m.

833-3   Statin Therapy and Mortality in Patients With Acute Myocardial Infarction Treated With Primary Angioplasty

Giuseppe De Luca, Harry Suryapranata, Jan Paul Ottervanger, Arnoud JW van't Hof, Jan CA Hoorntje, AT Marcel Gosselink, Jan-Henk E Dambrink, Felix Zijlstra, Menko-Jan de Boer, De Weezenlanden Hospital, Zwolle, The Netherlands

Background. Previous studies have shown that statin therapy can reduce long-term mortality in patients with significant risk factors for coronary artery disease or stable angina. However the benefits of statins in patients with ST-segment elevation myocardial infarction (STEMI) have yet to be extablished. Thus the aim of the current study was to determine whether statin therapy is associated with a reduction in mortality in patients with STEMI treated with primary angioplasty.

Methods. A total of 1513 consecutive in-hospital survivors treated with primary angioplasty for STEMI between April 1997 and October 2001 represent the population of the current study. All clinical, angiographic and 1-year follow-up data were prospectively collected.

Results. A total of 893 (59%) patients were on statins at discharge. At 1 year follow-up statins therapy was associated with a significantly lower mortality (1.2% vs 7.1%, RR [95% CI] = 0.16 [0.09-0.32], p < 0.0001). In almost all groups of patients identified by the propensity score analysis, statin therapy was associated with a significant reduction in mortality. Furthermore, statin therapy was an independent predictor of mortality at multivariate analysis (adjusted RR [95% CI] = 0.24 [0.12-0.47], p < 0.0001).

Conclusions: Statin therapy at discharge is associated with a significant reduction in 1-

year mortality after primary angioplasty for STEMI. Therefore, the use of statins after STEMI is highly recommended.

Log-rank = 36.96, p < 0.0001
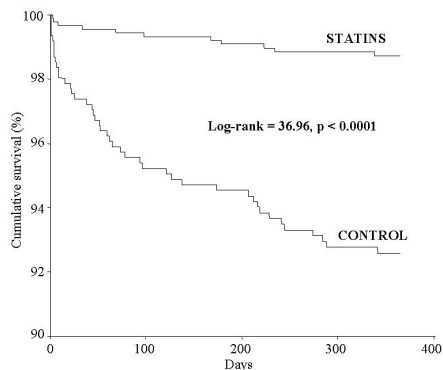
9:15 a.m.

833-4 Undertreatment of Low Serum High-Density Lipoprotein Cholesterol in Patients With Acute Myocardial Infarction

Anjli Maroo, W. H. Wilson Tang, Byron Hoogwerf, Stephen G. Ellis, Cleveland Clinic Foundation, Cleveland, OH

Background: The prevalance of low serum high-density lipoprotein cholesterol (HDL-C) in patients with acute myocardial infarction (AMI) is understudied. We examined contemporary patients hospitalized for AMI in order to determine the prevalance, clinical characteristics, and treatment patterns of those with low HDL-C (</= 40 mg/dL).
Methods: We reviewed 346 consecutive patients who presented with AMI and underwent urgent revascularization with percutaneous coronary intervention between 1/2000-12/2001. We excluded patients who had lipid panels drawn > 24 hours after presentation or who were cachectic (total cholesterol <100 mg/dL) (n=81). We compared clinical and laboratory data between patients with low HDL-C and HDL-C > 40 mg/dL by univariate analysis.
Results: In our cohort of 265 patients (mean age 61+/-14 years, 65% male, 20% diabetic, mean left ventricular ejection fraction 44+/-12%), 147 patients (55%) had low HDL-C. Compared to those with normal HDL-C, those with low HDL-C were younger, were more likely to be male, had lower systolic blood pressure, were more likely to be actively smoking, and had higher serum triglycerides (177 vs 110 mg/dL) (p</=0.01). There were no statistically significant differences in the number of diabetic patients or in mean LDL-C levels (105 vs 106 mg/dL) in either group. Overall, 49% of the entire cohort, and 29% of those with low HDL-C, had LDL-C levels </= 100 mg/dL. Only 7 patients (6%) in the low HDL-C group were discharged on niacin or fibrate preparations, even though 86 patients (59%) had no contraindications to pharmacotherapy. In contrast, 90% of the entire cohort (85% of the low HDL-C group) were discharged with statins.
Conclusions: Low HDL-C is highly prevalent (55%) in contemporary patients with AMI, many of whom have LDL-C levels below recommended targets. Although aggressive LCL-C lowering attenuates some of the adverse effects of low HDL-C, secondary prevention models that focus on targeting LDL-C alone do not adequately address current patterns of dyslipidemia. The opportunity for inclusion of HDL-C raising therapies prior to discharge in post-MI patients is clear.

9:30 a.m.

833-5 Markers of Inflammation Predict Mortality and Are Reduced by Pexelizumab in Patients With Acute Myocardial Infarction: Insights From the Complement Inhibition in Myocardial Infarction Treated With Angioplasty (COMMA) Trial

Pierre Theroux, Paul W. Armstrong, Kenneth W. Mahaffey, Judith S. Hochman, Scott Rollins, Kevin J. Malloy, Thomas Parish, Jose C. Nicolau, Joel Lavoie, Christopher B. Granger, Montreal Heart Institute, Montreal, PQ, Canada

Background: In the COMMA trial, inhibition of the complement protein C5 with pexelizumab (Pex) paradoxically reduced mortality without influencing infarct size *(Circulation 2003;108)*. We examined plasma markers to investigate the role of inflammation and the impact of treatment.
Methods: 350 patients in the Pex bolus and infusion and placebo groups were studied at baseline before Pex and PCI, at the end of infusion (24 hours), and 48 hours later. Levels of hsCRP were assessed by nephelometry, and IL-6 and TNFα by ELISA.
Results: All markers increased from baseline through 72 h (p<0.001). IL-6 levels peaked at 24 h, hsCRP and TNFα at 72 h. Older age and elevated CK-MB (AUC) were associated with higher IL-6 and hsCRP.
HsCRP was lower in the Pex group at 24 h (p=0.02). Levels of IL-6 and hsCRP were significantly reduced in Pex patients > 65 years at 24 h and 72 h; hsCRP in those with CK-MB > median was similarly reduced. Mortality at 90 days was strongly related to baseline levels of IL-6 (OR per increasing quartile: 3.2, 95% CI: 1.7-5.9), hsCRP (1.6, 1.1-2.5), and TNFα (1.4, 0.9-2.1).

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² 1 Median Concentrations
² 1 Baseline
² 1 Age > 65 yrs
² 1 CK-MB > median

Median Concentrations

	Baseline		24 h		72 h	
All patients	PI	Pex	PI	Pex	PI	Pex
IL-6 (pg/mL)	12.2	12.9	63.8	50.6	35.6	33.5
HsCRP (mg/L)	3.3	2.8	25.1	17.1*	41.5	35.9
TNFα (pg/mL)	0.88	0.82	1.16	1.44	1.57	1.65
Age > 65 yrs						
IL-6	16.7	14.8	88.2	56.1**	64.4	41.7*
HsCRP	3.5	3.7	31.7	17.9*	84.5	39.4**
CK-MB > median						
HsCRP	3.5	2.7	31.9	19.1**	74.4	45.1*

Pex vs placebo, * p<0.05, **p<0.01

Conclusion: In the MI population undergoing primary PCI, inflammation intensity correlated with older age and higher CK-MB, and basal values predicted mortality. Pex appeared to reduce hsCRP during drug infusion, and sustained a reduction of hsCRP and IL-6 in high-risk patients. The novel findings support both a role for inflammation and the complement in MI, and a potential explanation for the treatment effect of C5 inhibition with pexelizumab.

9:45 a.m.

833-6 An Updated Meta-Analysis of the Effect of Glucose-Insulin-Potassium on Survival in Acute Myocardial Infarction: Impact of Reperfusion Therapy

Ramesh M. Gowda, David L. Brown, Beth Israel Medical Center, New York, NY

Background: Glucose-insulin-potassium (GIK) has been proposed as adjuvant therapy in acute myocardial infarction (AMI) because of its ability to induce multiple favorable metabolic alterations in the cardiac myocyte. However, randomized controlled trials performed over the last 4 decades have yielded conflicting results regarding the impact of GIK on mortality in AMI. We performed an updated meta-analysis to investigate the effect of GIK on mortality in AMI. **Methods**: A comprehensive MEDLINE search revealed 13 randomized controlled trials of GIK treatment in AMI. The odds ratios of the individual trials were pooled using a random effects model. Separate meta-analyses were performed of the 9 studies in which no reperfusion therapy was provided and the 4 studies in which GIK was administered in addition to reperfusion therapy. **Results**: Of the 4149 patients randomized, 2145 received GIK while 2004 were in the control groups. Mortality was reduced from 13% (257/2004) in the control group to 11% (234/2145) in the GIK-treated patients (Odds Ratio (OR), 0.78; 95% confidence interval (CI), 0.58 to 1.05; P=0.106). In the trials performed without reperfusion therapy, the mortality was reduced from 20.5% (192/934) in the control group to 16.6% (149/897) in the GIK-treated group (OR, 0.77; 95% CI, 0.60 to 0.98; P=0.034). In the trials with reperfusion therapy, there was a slight increase in mortality from 6.0% (65 /1070) in the control group to 6.8% (85/1248) in the GIK-treated patients (OR, 0.97, 95% CI, 0.46 to 2.0; P=0.945). **Conclusion**: There appears to be a trend toward a reduction in mortality by GIK in AMI. However, the benefit of GIK is restricted to patients who do not receive reperfusion therapy. Patients who receive reperfusion therapy do not benefit from GIK. GIK should be considered for AMI patients who are not eligible for reperfusion therapy.

Myocardial Ischemia and Infarction