

POSTER SESSION

1029 Interventional Techniques: New and Unique

Sunday, March 30, 2003, Noon-2:00 p.m.
McCormick Place, Hall A
Presentation Hour: Noon-1:00 p.m.

1029-187 A Novel Invasive Assessment of the Coronary Microcirculation

William F. Fearon, Leora B. Balsam, H. M. Omar Farouque, Anthony D. Caffarelli, Robbert C. Robbins, Peter J. Fitzgerald, Paul G. Yock, Alan C. Yeung, Stanford University, Stanford, CA

Background: A relatively simple, invasive method for assessing the status of the coronary microcirculation independent of the epicardial artery is lacking.

Methods: Using a coronary pressure wire and modified software, which allows the pressure transducer to act as a distal thermistor and the shaft of the wire as a proximal thermistor, it is possible to calculate the mean transit time of room temperature saline injected down the left anterior descending artery (LAD) during maximal hyperemia. The inverse of this hyperemic mean transit time has been shown to correlate with absolute hyperemic flow. We hypothesized that the distal coronary pressure divided by the inverse of the mean transit time would provide an Index of Microcirculatory Resistance (IMR) that would correlate with true microcirculatory resistance (distal pressure/distal flow). Using an open-chest pig model, we compared IMR to the true microcirculatory resistance, defined as the distal LAD pressure measured with the coronary pressure wire, divided by absolute flow, measured with an external flow probe around the LAD, at maximal hyperemia. In 6 pigs these measurements were made in a normal LAD, after creation of an epicardial LAD stenosis, and after disruption of the coronary microcirculation using embolized microspheres, with and without an epicardial LAD stenosis.

Results: In a total of 31 measurements, IMR correlated with true microcirculatory resistance ($r=0.52$, $p=0.003$). The average IMR in vessels with disrupted microcirculation, irrespective of the epicardial artery status, was 30.3 ± 14 versus 17.7 ± 5.5 in those with normal microcirculation ($p=0.002$). The corresponding values for the true microcirculatory resistance were 0.93 ± 0.38 versus 0.51 ± 0.23 mmHg/ml/min ($p<0.001$). Doppler wire-derived coronary flow reserve correlated weakly with true microcirculatory resistance ($r=0.38$, $p=0.04$).

Conclusion: This Index of Microcirculatory Resistance (IMR) provides a simple, quantitative, invasive assessment of the coronary microcirculation independent of the epicardial artery.

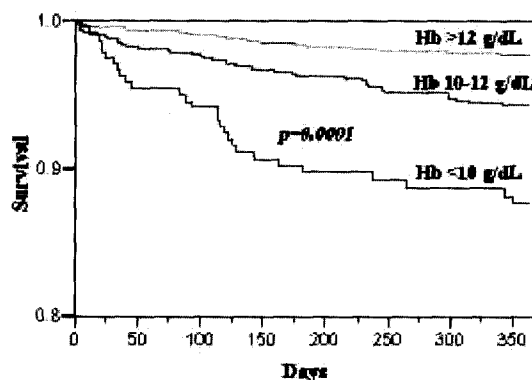
1029-188 Baseline Hemoglobin Is a Novel Predictor of Mortality After Percutaneous Coronary Intervention

Annapoorna S. Kini, Paul Lee, Cristina A. Mitre, Samin K. Sharma, The Mount Sinai Medical Center, New York, NY, The University of Toronto, Toronto, ON, Canada

Background: Anemia has been reported as an important factor of adverse prognosis in various patient subgroups with critical illness, heart failure, or MI. The effect of baseline hemoglobin (BHb) level on acute and mid-term results in patients undergoing PCI has not been reported.

Methods and Results: We analyzed 6289 consecutive PCI patients at our center from July 1999 to June 2002, for in-hospital events and 1-year mortality. Patients were divided in 3 groups based on BHb: <10 , $10-12$, and >12 g/dL. BHb was an independent predictor of LVEF along with diabetes, MI, chronic renal failure, and number of vessel diseased. Peri-procedural creatine kinase-MB (>16 U/L) and troponin I (>2 ng/mL) elevation was significantly higher in the low BHb vs. normal BHb group ($p=0.001$). Even after adjustment for baseline characteristics, BHb level independently correlated with mortality on multivariate analysis (figure). Other independent predictors of mortality were: age ($p=0.0001$), LVEF $<30\%$ ($p=0.01$), symptomatic heart failure ($p=0.02$), peripheral vascular disease ($p=0.01$), and pre-PCI GP IIb/IIIa use ($p=0.01$).

Conclusion: In the current PCI era, among other well-established predictors of mortality, BHb <12 g/dL has been found to be an independent predictor of mortality. This may be mediated by an exacerbation of the imbalance between oxygen supply and demand present in patients with coronary artery disease undergoing PCI. The present analysis underscores the role of the stem cell function during PCI.



1029-189

Baseline C-Reactive Protein and Cardiac Troponin I as Predictors of Outcome Following Percutaneous Coronary Intervention in Stable and Unstable Coronary Disease

Thuraja Nageh, Roy A. Sherwood, Ray J. Wainwright, Ajay M. Shah, David E. Jewitt, Belinda Asonganyi, Martyn R. Thomas, King's College Hospital, London, United Kingdom

Background: Elevated C-reactive protein (CRP) appears to be strongly predictive of adverse cardiac events in stable and unstable cardiac disease. Cardiac Troponin I (cTnI) has also been shown to be a strong prognostic marker of outcome. We compared the predictive value of both markers for adverse events following percutaneous coronary intervention (PCI). **Methods:** A total of 466 (316 stable and 150 unstable) patients presenting with coronary disease suitable for PCI were studied prospectively. Baseline CRP and cTnI concentrations were determined pre-PCI and the patients were followed up for adverse cardiac events (death, Q wave MI or repeat revascularisation) for up to 18 months. **Results:** Baseline CRP was elevated in 11% of stable and 35% unstable patients ($\text{Chi}^2 = 44.5$, $p<0.0001$). cTnI was positive in 2.5% of stable and 25% of unstable patients ($\text{Chi}^2 = 43.9$, $p<0.0001$). Amongst the stable population, 56% of CRP-positive patients and 25% of cTnI-positive patients had adverse events at follow up. In the unstable patients, 57% CRP-positive and 42% cTnI-positive patients had adverse events at follow up. In stable patients, elevated baseline CRP had a positive predictive value (PPV) for adverse events of 0.6 and a negative predictive value (NPV) of 0.8 ($\text{Chi}^2 = 29.1$, $p<0.0001$). Baseline cTnI was not significantly predictive of long term outcome amongst the stable population. In unstable patients, CRP had a PPV of 0.6 and an NPV of 0.9 ($\text{Chi}^2 = 26.9$, $p<0.0001$) and cTnI a PPV of 0.6 and NPV of 0.8 ($\text{Chi}^2 = 35.7$, $p<0.0001$). The combination of a positive CRP and cTnI had a PPV of 0.7 and NPV of 0.8 in stable and unstable patients ($\text{Chi}^2 = 60.68$ and 54.4 , respectively; $p<0.0001$). The Odds Ratio (OR) for adverse events at follow up increased progressively with higher quartiles of CRP: 25th centile OR 3.8 (95% CI 1.5 to 7.9), 50th centile OR 9.8 (95% CI 5.2 to 16.2) and 75th centile OR 11.6 (95% CI 4.4 to 15.7). **Conclusions:** Elevated baseline CRP is a strong and independent predictor of adverse events in both stable and unstable coronary disease. Baseline cTnI is only useful as a prognostic marker in unstable patients. The combination of an elevated CRP and cTnI provided only a marginal additional benefit to the prognostic value of CRP alone.

1029-190

Restoration of Normal Coronary Flow After No-Reflow Phenomenon Does Not Improve Post-Procedural Myocardial Infarction in Patients Without ST-Segment Elevation Myocardial Infarction

Cem Barcin, Ali E. Denktas, Ryan J. Lennon, LaVon Hammes, Amir Lerman, David R. Holmes, Jr., Kirk N. Garratt, Mayo Clinic, Rochester, MN

Background: No-reflow phenomenon (NR) during percutaneous coronary intervention (PCI) is a strong predictor of major cardiac events in acute myocardial infarction (MI). We sought to determine the effects of NR on outcome and the significance of restoration of flow in patients without ST segment elevation MI (STEMI).

Methods: We evaluated 3390 PCIs performed between 1/2000 and 12/2001 in Mayo Clinic. Pts without STEMI who had an NR episode were identified and divided into 2 groups according to final angiogram (complete restoration (TIMI 3) vs. partial restoration ($<$ TIMI 3)). TIMI flow grades were classified as TIMI 0, 1, 2 "slow", 2 "fast" and 3 and scored as 0, 1, 2, 2.5 and 3, respectively. Pts who had an episode of NR ($n=76$) were compared with age, sex and segment matched controls without STEMI ($n=152$) in terms of in-hospital and 6-month death, MI and target vessel revascularization rates.

Results: TIMI scores from NR episode to the final angiogram improved from 1.4 ± 0.8 to 3.0 ± 0.0 in the complete group ($n=34$) and from 1.6 ± 0.7 to 2.4 ± 0.3 in the partial group ($n=42$). Despite complete restoration of epicardial flow, post-procedural MI was higher than the control group and was not different from partial restoration group (see table). Six-month outcome was similar among groups.

Conclusion: No-reflow is associated with poor prognosis even in pts without STEMI despite complete restoration of epicardial coronary flow. This finding may suggest the discordance between the blood flow in epicardial and myocardial level.