all power of the model, whilst a significant improvement was obtained after entering redox pattern data (Figure).

**Conclusions:** The assessment of redox pattern yields incremental diagnostic value over clinical and biochemical data in predicting CAV. In particular, GSHe may represent a clinically useful marker of risk.

**11:30 a.m.**

**813-3**

**Reduction of Plasma Cholesterol and Fibrinogen by H.E.L.P. Apheresis Increases Myocardial Perfusion in Heart Transplant Patients**

Beate R. Jaeger, Frank Bengel, Kenichi Otsaka, Carlos A. Labarreere, Stefan Bengsch, Clemens Engelschalk, Eckart Kreuzer, Peter Ueberfuhr, Bruno Reichart, Dietrich Seidel, Klinikum der Universitat Muenchen, Technische Universität Muenchen, München, Germany, Methodist Research Institute, Clarian Health Partners, Indianapolis, IN

**Introduction and Hypothesis:** Given the central importance of the microvasculature in heart transplant patients, we investigated the possibility of increasing cardiac perfusion following reduction of LDL-cholesterol and fibrinogen plasma levels after apheresis treatment in transplanted hearts.

**Methods:** Ten long-term heart transplant recipients were examined with positron emission tomography (PET) to measure myocardial perfusion before and after a single Heparin-mediated Extracorporeal LDL Precipitation (H.E.L.P.) apheresis treatment. H.E.L.P. apheresis reduced the plasma levels of LDL-cholesterol and lipoprotein (a) by 48% (p<0.001), fibrinogen by 42% (p<0.000), plasma viscosity by 14%, and erythrocyte aggregation by 28%. Osmolality (<1%) and hematocrit (<1%) remained unchanged. The PET studies were performed the mornings before and after the apheresis treatment. Myocardial blood flow at rest and during adenosine-induced hyperemia was measured using 13N-ammonia.

**Results:** A single apheresis treatment significantly increased myocardial blood flow at rest by 17.5% (p<0.01) and hyperemic flow by 27% (p<0.02). Coronary flow reserve increased by 9% (p<0.09). Hyperemic flow following adenosine infusion increased plasma VEGF levels only before H.E.L.P. apheresis, indicating a better ischemic tolerance after apheresis.

**Conclusion:** Myocardial perfusion in transplanted hearts significantly increases following H.E.L.P. apheresis treatment. The present study provides complementary evidence to clinical long-term studies demonstrating that cholesterol reduction either with statins and/or apheresis improves heart transplant outcome.

**11:45 a.m.**

**813-4**

**Smooth Muscle Cell Proliferation Index Correlates With Indium-111 ZD03 Antibody Uptake in a Transplant Vasculopathy Swine Model**

Javier Jimenez, Dillip Sawatt, Tammy Donahay, Lorraine Schofield, Ban An Khaw, Lynne L. Johnson, Rhode Island Hospital, Providence, RI

**Background:** Smooth muscle cell (SMC) proliferation is a hallmark of transplant vasculopathy (TV). The goal of this study was to determine the ability of gamma camera imaging of a monoclonal antibody (ZD03) tagged with Indium-111 to detect TV.

**Methods:** Coronary to right carotid transplantation was performed in 10 Yucatan mini pigs using farm pigs as donors. In 5 of these experiments the RC was also grafted into the LC (homografts) and in one farm pig the LC and RC were switched. After 44±22 days animals were injected with BrdU, underwent planar and SPECT imaging and were sacrificed and vessels removed. Tissue was sectioned and stained. Quantitative morphometry was performed. SMC proliferation index (BrdU-actin cells/actin x 100) was correlated with in vivo and ex vivo uptake.

**Results:** Patency was obtained in only 5/10 allografts and 3/7 homografts. Six of the ten long-term heart transplant recipients were examined with positron emission tomography (PET) to measure myocardial perfusion before and after a single Heparin-mediated Extracorporeal LDL Precipitation (H.E.L.P.) apheresis treatment. H.E.L.P. apheresis reduced the plasma levels of LDL-cholesterol and lipoprotein (a) by 48% (p<0.001), fibrinogen by 42% (p<0.000), plasma viscosity by 14%, and erythrocyte aggregation by 28%. Osmolality (<1%) and hematocrit (<1%) remained unchanged. The PET studies were performed the mornings before and after the apheresis treatment. Myocardial blood flow at rest and during adenosine-induced hyperemia was measured using 13N-ammonia.

**Conclusion:** Myocardial perfusion in transplanted hearts significantly increases following H.E.L.P. apheresis treatment. The present study provides complementary evidence to clinical long-term studies demonstrating that cholesterol reduction either with statins and/or apheresis improves heart transplant outcome.

**Risk Factors for CAV**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Hazard Ratio</th>
<th>CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statin Therapy</td>
<td>0.29</td>
<td>0.09 – 0.96</td>
<td>0.03</td>
</tr>
<tr>
<td>Late Rejection</td>
<td>2.27</td>
<td>1.31 – 3.92</td>
<td>0.003</td>
</tr>
<tr>
<td>Earlier Year of Transplant</td>
<td>2.03</td>
<td>1.03 – 4.16</td>
<td>0.04</td>
</tr>
</tbody>
</table>

**11:00 a.m.**

**814**

**Heart Failure: Cell Therapy**

Monday, March 08, 2004, 11:00 a.m.-12:15 p.m.
Morial Convention Center, Room 254

**814-1**

**Transendocardial Injection of Autologous Bone Marrow Mononuclear Cells May Enhance Myocardial Viability Around Cell Injection Site**

Emerson C. Peris, Hans F. Dohmman, Radovan Borejic, Joao A. Assad, Guilherme V. Silva, Suzana A. Silva, Andre L. Sousa, William K. Vaughn, Isabel Rossi, Antonio C. Carvalho, Yong J. Geng, Hans J. Dohmann, James T. Willerson, Texas Heart Institute, Houston, TX, Pro-Cardiaco Hospital, Rio de Janeiro, Brazil

**Background:** Autologous Bone Marrow Mononuclear Cell (ABMMIC) injection in humans has shown improvement in areas reversible perfusion defects possibly through the promotion of localized angiogenesis. Electromechanical voltage maps (EMVM) are capable of assessing myocardial viability through the magnitude of underlying myocardial electrical signals. Improvement in voltage values of previously non-viable tissue surrounding cell injection sites was observed. We sought to systematically determine if ABMMIC injections might expand areas of myocardial viability.

**Methods:** Fourteen pigs (60 ± 10 g, 12 males) with ischemic cardiomyopathy were treated with ABMMIC transendocardial injections in a target area of reversible defect by EMVM and viability by EMVM voltage criteria. Average electrical unipolar voltage was quantified in the injected area and in the area surrounding injections (peri-injection area) immediately before and 4 months after the procedure. To assess the reproducibility of EMVM a...