out coronary artery disease. Endothelium-dependent and independent dilation, before and after L-NMMA, was measured in the femoral circulation with intra-arterial acetylcholine (ACH) and sodium nitroprusside (SNP), respectively. Three and 5 minutes periods of ischemia were produced by cuff infla-
tion over the thigh and peak hyperemic responses were measured. Femoral vascular resistance was derived from continuous Doppler flow velocity and blood pressure measurements.

Results:

% Increase in Vascular Resistance with L-NMMA

<table>
<thead>
<tr>
<th>Baseline</th>
<th>ACH</th>
<th>SNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 ± 24**</td>
<td>57 ± 51**</td>
<td></td>
</tr>
</tbody>
</table>

mean ± SD, *p < 0.01, **p < 0.001

L-NMMA produced a significant increase in vascular resistance at rest, after ACH, and after 3 and 5 minute periods of ischemia and hyperemia, but did not affect endothelium-independent dilation with SNP. Pts with greater inhibition of ACH-induced dilation with L-NMMA also had a greater inhibition of reactive hyperemia with L-NMMA (r = 0.47, p < 0.001).

Conclusions: 1) NO release contributes to microvascular vasodilation in response to ischemia, and 2) endothelial dysfunction resulting in reduced release of NO in response to ACH correlates with diminished vasodilatory response to reactive hyperemia. These findings suggest that the contribu-
tion of NO to vasodilation in response to metabolic stress is attenuated in pts with endothelial dysfunction and imply that endothelial dysfunction in the coronary vasculature may, by limiting vasodilatation during stress, also accentuate myocardial ischemia.

916 Hemodynamics/Shock/Assist Devices

Monday, March 20, 1995, Noon–2:00 p.m.

Ernest N. Morial Convention Center, Hall E

Presentation Hour: 1:00 p.m.–2:00 p.m.

916-83 Use of Vasodepressors Rather than Vasopressors to Treat Shock Guided by Transesophageal Echocardiography


We present five patients (4 females, 1 male, age range 62–79 yrs) with severe hypotension aggressively treated and who had persistent shock. The clinical setting included 2 pts following SVT, 2 pts postoperatively, and 1 pt with hemorrhagic shock. The initial evaluation suggested aortic dissection, cardiac tamponade, acute mitral regurgitation, cardiac contusion or cardio-
genic shock. A transesophageal echo was performed and was nondiagnostic. The transesophageal echocardiogram (TEE) clearly ruled out these causes of shock and established the diagnosis of provokable hypertrophic obstructive cardiomyopathy (HOCM) with systolic anterior motion of the mitral valve (SAM), increased left ventricular outflow tract velocity and mitral regurgitation. None of the patients had asymmetric septal hypertrophy or positive family history for HOCM and only one had a history of hypertension.

During the echo study, vasopressors were discontinued and serially IV fluid, IV beta blocker followed by IV clopidogrel were used stepwise until the SAM and outflow tract obstruction resolved. The systolic blood pressure (SBP), pulse (P) were recorded and Cardiac Output (CO) and Index (CI) were noted with a Swan-Ganz catheter before and after the therapeutic in-

tervention and TEE:

- SBP (mmHg) P (BPM) CO (l/min) CI (l/min/m²)
- Preintervention (mean) 89 109 3.3 1.6
- Postintervention (mean) 137 99 5.3 2.7

We conclude that TEE is a valuable tool in patients with shock to establish the cause of hypotension of undetermined etiology. Elucidating the pathophysiology of severe hypotension by TEE can profoundly affect the man-
agement of these patients by correctly redirecting therapy. In patients with severe hypotension who do not respond to vasopressors the diagnosis of provokable HOCM should be considered and a TEE performed. The TEE is valuable not only to diagnose this unusual condition but also to assist in titrating therapy.

916-84 Balloon Angioplasty Evaluated In Vitro by Intracoronary Ultrasound: A Validation with Histology

Elma J. Gussenhoven, Aad van der Lugt, Salem H.K. The, Wenguang Li, Theo Stijnen, Frans C. van Egmond, Jeroen van Essen, Hert van Uit, Nicolaas Bom. University Hospital Rotterdam-Dijkzigt, Erasmus University Rotterdam and the Interuniversity Cardiology Institute, The Netherlands

To determine whether one single cross-section obtained with intracoronary ultrasound (ICUS) at the most stenotic site is representative for the ultimate outcome following balloon angioplasty, 25 coronary artery specimens were studied in vitro using a displacement sensing device. Corresponding ultra-

sound cross-sections (n = 250) were compared with their histologic coun-
terpart.

Qualitative: Prior to intervention the sensitivity and specificity of eccen-
centric and soft/hard was high (≥96%), the specificity of lipid was high (81%), whereas its sensitivity was low (31%). Following intervention the specificity of morphologic features present was higher than the sensi-
tivity: dissection 100% vs 60%; plaque rupture 93% vs 16%; and internal elastic lamina rupture 94% vs 54%. Similar data were obtained for all cross-
sections and at the most stenotic site. The incidence of pathologic changes at the stenotic site was higher compared to the overall result. Consid-
ering all cross-sections evaluated, concanetric lesions were more frequently associated with a dissection and plaque rupture than eccentric lesions; no such relation was evidenced at the most stenotic site.

Quantitative: As result of balloon angioplasty ICUS imaging revealed an in-
ncrease in free lumen area (FLA) and media-boundary area (MBA), whereas plaque area (PLA) reduced slightly. Large differences were encountered when mean values were compared with values obtained at the most stenotic site: FLA increase 30% vs 60% and MBA increase 12% vs 20%. No differences were found in mean PLA reduction and PLA reduction at the most stenotic site (5% vs 8%).

Conclusion: This is the first in vitro study that systematically examined coronary arteries with ICUS before and after balloon angioplasty. Comparing the overall data obtained within the dilated specimen to the most stenotic site it was found that similar data were obtained for sensitivity and specificity. The pathologic and quantitative changes seen at the most stenotic site fol-

lowing intervention were more outspoken compared to the overall data.

916-85 Correction of Mitral and Tricuspid Regurgitation Improves Hemodynamic and Clinical Status in the Patients with Primary Dilated Cardiomyopathy


Patients with primary dilated cardiomyopathy particularly at the terminal stage represent a special clinical problem because of refractoriness to medi-
cal treatment. The influence of mitral and tricuspid regurgitation to the homo-
dynamic parameters is very important. In our institution the correction of mi-
tral and tricuspid insufficiency was performed in 24 patients (5 females and 19 males) with the mean age of 48 years. Reconstruction of the mitral annu-
lus was carried out by the application of Carpenter’s ring and by the method of Prof. Radovanovic in 9 and 15 patients, respectively. The analysis of hemodynamic parameters was made in the period prior to the surgical intervention (cardiac catheterization, before ECC) and after the correction (after ECC, 24 and 48 hours from ECC). The results are presented in the table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Catheter</th>
<th>Ref ECC</th>
<th>After ECC</th>
<th>24 h</th>
<th>48 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD (l/min)</td>
<td>3.66</td>
<td>3.77</td>
<td>6.79</td>
<td>6.49</td>
<td>5.80</td>
</tr>
<tr>
<td>CI (l/min/m²)</td>
<td>1.87</td>
<td>2.02</td>
<td>3.79</td>
<td>3.46</td>
<td>3.10</td>
</tr>
<tr>
<td>CVP (mmHg)</td>
<td>8.33</td>
<td>8.28</td>
<td>3.65</td>
<td>4.56</td>
<td>4.76</td>
</tr>
<tr>
<td>PAP (mmHg)</td>
<td>38.17</td>
<td>31.80</td>
<td>20.81</td>
<td>22.60</td>
<td>25.00</td>
</tr>
<tr>
<td>PCW (mmHg)</td>
<td>25.08</td>
<td>21.00</td>
<td>11.10</td>
<td>11.70</td>
<td>13.10</td>
</tr>
<tr>
<td>PVR (dyne sec cm⁻⁵)</td>
<td>605.29</td>
<td>461</td>
<td>212</td>
<td>257</td>
<td>291</td>
</tr>
<tr>
<td>SVR (dyne sec cm⁻⁵)</td>
<td>3265</td>
<td>3552</td>
<td>1771</td>
<td>1694</td>
<td>1987</td>
</tr>
</tbody>
</table>

Postoperative mortality (30 days) was 0.0%. According to our results, sig-
nificant hemodynamic and clinical improvement in patients with severe heart failure was attained by the correction of mitral and tricuspid insufficiency. It may serve as a bridge to heart transplantation. Early correction of mitro-
tricuspid regurgitation slows down progression of myocardial insufficiency.