Twenty minutes following CTO, they were randomized to either 30 minutes of (a) mega-
hertz (MHz) TLFUS and IV PESDA ± tissue plasminogen activator (TPA; 1 mg/kg) or (b) TPA ± 1 MHz TLFUS alone. All pigs received IV heparin and aspirin. Angiographic REC rates, early-closure kinetic MB fraction (CK MB) at two hours post CTO, as well as wall thickening (WT) and microsphere derived MBF in the risk area (RA) at day zero and 28 were compared. Results: REC rates at 60 minutes were 50%. Early CPK-MB release was higher in the PESDA-treated group (12,870 ± 17,065 vs 2162 ± 627; p<0.006). Even in the absence of REC, MBF increased in the RA of pigs treated with PESA (with or without TPA Table), and continued to improve at 28 days. WT in the RA at 28 days in pigs that did not REC was similar to those that recanalized (16±5%). Conclusions: IV PESDA and TLFUS improve regional MBF and function within the RA early even in the absence of REC, and may improve functional recovery in acute myocardial infarction.

MFB and WT following Acute Coronary Thromboses

<table>
<thead>
<tr>
<th>Group</th>
<th>US ± PESA + TPA</th>
<th>US + TPA</th>
<th>No recanalization</th>
<th>No recanalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBF Ratio Change 1 hour</td>
<td>0.21 ± 0.29</td>
<td>0.24 ± 0.29</td>
<td>-0.04 ± 0.03</td>
<td>0.05 ± 0.03</td>
</tr>
<tr>
<td>MBF Ratio Change 28 days</td>
<td>0.41 ± 0.29</td>
<td>0.26 ± 0.28</td>
<td>0.2 ± 0.28</td>
<td>0.1 ± 0.28</td>
</tr>
<tr>
<td>%WT 28 days</td>
<td>17:27%</td>
<td>72%</td>
<td>15:16%</td>
<td>13:14%</td>
</tr>
</tbody>
</table>

1188-53 Early Detection of Coronary Microvascular Endothelial Dysfunction Using Intravenous Microvascular Contrast Echocardiography

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Background: Myocardial contrast echocardiography (MCE) has been shown a useful method for detecting and quantifying myocardial perfusion. The purpose of this study was to determine whether intravenous MCE can be used for the early detection of the change of myocardial perfusion induced by coronary microvascular endothelial dysfunction.

Methods: 10 hyperglycemia dogs and 10 control dogs underwent myocardial perfusion imaging with MCE. The change of PI, Tp, T1/2 from T1 to T2 derived from MCE time-intensity curve were observed in two groups of dogs after injecting acetylcholine (Ach) and nitroglycerin (NTG), meanwhile compared with myocardial blood flow (MBF) measured by radiolabeled microspheres.

Results: In control group, There were a significant increase in PI and a markedly decrease in Tp, T1/2 after Ach and NTG injecting. In hyperglycemia group, PI enhanced significantly and Tp, T1/2 reduced markedly after NTG injecting. While PI, Tp and T1/2 did not change after Ach injecting. There was a good correlation between MBF and PI, Tp and T1/2 derived from MCE. The correlation coefficient is 0.84-0.91 and the best correlation were noted in PI.

Conclusion: Intravenous MCE can be used to early detect the change of myocardial perfusion induced by coronary microvascular endothelial dysfunction. To clarify whether this method can eliminate the influence of cardiac microvascular perfusion induced by coronary microvascular endothelial dysfunction in the clinical setting.

A Novel Method for Estimating a Normalized Value of Myocardial Blood Volume by Compensating for the Attenuation of Incident Ultrasound in Contrast Echocardiography

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Background and Purpose: Although myocardial contrast echocardiography (MCE) is currently undergoing significant development, the attenuation of incident ultrasound with depth is one of the major limitations for the quantification of MCE. We propose a novel method to estimate a normalized value of myocardial blood volume by measuring the ratio of amplitudes of backscatter from the myocardium to the intracavity blood area adjacent to the myocardium. To clarify whether this method can eliminate the influence of attenuation of incident ultrasound, we investigated the harmonic power Doppler (HPD) method for detecting and quantifying myocardial perfusion.

Methods: Images obtained in 10 normal volunteers. Using SONGS 5500 and $3 probe (Phillips), intermittent HPD images in the left ventricular short-axis plane were acquired at end systole every 6 cardiac beats during continuous infusion of Levosist (3 or 4 ml/min), and 5 cumulative images were stored. On each HPD image, the amplitude of backscatter from the anteroseptum (AmpAs) and that from the region of interest placed at the right ventricular cavity nearby the anteroseptum were measured in decibels, and the ratio (myocardium/blood area) of amplitudes (RelAmpAs) was calculated by subtracting the value in blood area from that in myocardium in decibels. Also in the posterior wall, the ratio of amplitudes (RelAmpAp) was calculated by subtracting the value in the left ventricular cavity adjacent to the posterior wall that in the posterior wall (AmpAp). These indexes were measured in 50 images obtained from 10 subjects and expressed as means±SD.

Results: Although AmpAs was markedly higher than AmpP (24.1±1.6 vs 4.8±2.2 dB, p<0.0001), RelAmpAs was similar to RelAmpP (-15.4±1.3 vs -13.9±1.4 dB, p=0.17). Since the blood volume and refluxed blood area is 100±100 cm³, the blood volume in the anteroseptum and that in the posterior wall were estimated to be 4.78±1.53 and 4.27±1.33 ml/100cm³ from RelAmpAs and RelAmpAp, respectively.

Conclusion: Measurement of the ratio of amplitudes of backscatter from the myocardium to that from the intracavity blood area adjacent to the myocardium can eliminate the influence of attenuation of incident ultrasound with depth, and therefore provide a normalized estimate for myocardial blood volume.

1188-55 Nicardipine Preserves Collateral Circulation Even at Low Systemic Pressure in Comparison With Nitroglycerin: Real-Time Myocardial Contrast Echocardiographic Study

Akiko Iwata, Fuminobu Ishikura, Kentaro Ohtani, Juri Okazaki, Hideo Hirayama, Yasushi Kashigawa, Sachiko Yagura, Tsutomu Toshida, Toshihiko Asanuma, Shintaro Beppu, Osaka University, Suita, Japan.

Background and Purpose: Collateral circulation of microvascular size is important for salvaging the myocardium at risk by coronary obstruction. However, it has not been elucidated the effect of therapeutic agents on the site of micro-collateral circulation. The aim of this study was to evaluate the effect of nitroglycerin (NG) and nicardipine (NE) on micro-collateral circulation by using real-time myocardial echocardiography (MCE).

Methods: Real-time MCE along the LV short axis was examined by Sequoia 512 (Siemens) during infusion of 0.1-0.15 ml/min of Option in 8 open-chest dogs having good collateral circulation. Presence of collateral flow was determined by opacification of the left coronary occlusion followed by bubble destruction. The left circumflex artery (LCx) was completely opacified and contrast echo video intensity (VI) (256 gray scale) of the area at risk was examined at control, during NTG (0.01-0.02 mg/kg) and NIC (0.1-0.2 mg/kg) infusion. The flow volume of left anterior descending coronary artery (LAD) and mean systemic blood pressure (mBP) was also measured before and after NTG and NIC.

Results: Both NTG (82±21 mmHg to 54±19 mmHg) and NIC (81±18 mmHg to 58±12 mmHg) reduced mBP significantly in all dogs (p<0.01, respectively). In this setting, the alteration of mBP was identical between these vasodilators. However, the increment of VI during LCx occlusion was significantly higher during NIC than NTG infusion (24.0±14.7 vs 15.5±11.2, p=0.05). LAD flow significantly increased after NIC (12.1±5.9 ml/min to 14.2±14.3 ml/min), while not after NTG (13.7±6.7 ml/min to 14.5±12.6 ml/min). Conclusions: Nicardipine will preserve coronary flow volume through micro-collateral circulation even if the hypotension may be induced by its vasodilating effect.

1188-56 Accuracy of Intravenous Myocardial Contrast Echocardiography for Assessment of Ischemic Area of the Heart in Mice

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Background and Purpose: There is no adequate method for evaluating the ischemic area of the heart in situ in mice, while this evaluation is indispensable for genetically altered mice having cardiac disease. We examined the feasibility of intravenous myocardial contrast echocardiography (MCE) in mice.

Methods: Open chest mice (weight 38-41 g) were examined before and after coronary ligation. MCE in the short axis view was performed using intermittent triggering imaging (every 5-10 beats) with high mechanical index (1.6) by SONOS 5500 (Philips) with 512 probe (5-12 MHz). Micro-collateral circulation by using real-time myocardial echocardiography (MCE). All bubbles were destroyed by one-second exposure of high acoustic power just after left circumflex artery ligation, MCE in the short axis view was performed using intermittent triggering imaging (every 5-10 beats) with high mechanical index (1.6) by SONOS 5500 (Philips) with 512 probe (5-12 MHz). Micro-collateral circulation by using real-time myocardial echocardiography (MCE).

Results: In each mouse, myocardial opacification in the synergic area and non-opacification in the asynergic area was clearly identified. The ratio of non-opacified area showed a good correlation with the ratio of non-stained area by Evans blue (yn=0.93x+0.51, r=0.94).

Conclusion: MCE is feasible to assess the ischemic area accurately in a mouse.