Twenty minutes following CTO, they were randomized to either 30 minutes of (a) mega-nhertz (Mhz) TLFUS and IV PESA ± TPA or (b) TPA + 1 Mhz TLFUS alone. All pigs received IV heparin and aspirin. Angiographic REC rates, early cretine kinase 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. REC rates at 60 minutes were 50%. Early CPK-MB release was higher in the PESA-treated group (18,270 ± 17,055 vs 2162 ± 827 units; 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 treated with PESA did not differ from that of controls (16±36%). Conclusions: IV PESA 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. MBF and WT following Acute Coronary Thromboses

**Table 1**

<table>
<thead>
<tr>
<th>Group</th>
<th>US + PESA + TPA</th>
<th>No recanalization</th>
<th>US + TPA</th>
<th>No recanalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBF Ratio Change 1 hour</td>
<td>0.21 ± 0.29</td>
<td>0.045 ± 0.003</td>
<td>0.41 ± 0.29</td>
<td>0.28 ± 0.28</td>
</tr>
<tr>
<td>%WT - 28 days</td>
<td>17 ± 27%</td>
<td>74%</td>
<td></td>
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</tr>
</tbody>
</table>

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

**Xiaobo Huang, Yiu Liu, Pingjhen Wu, Daogang Zha, Yi Luo, Xiaolin Chen, Division of Cardiology, Nanfang Hospital, Guangzhou, People's Republic of China.**

**Background:** Myocardial contrast echocardiography (MCE) has been shown a useful method in 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 and T1/2 derived from MCE data from the left ventricle in situ in mice, while this evaluation is indispensable for genetically altered mice having cardiac diseases. We examined the feasibility of intravenous myocardial microvascular flow (MBF) measurement by radiolabeled microspheres.

**Results:** In control group, Tp were significantly increased 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 had no obviously changes after ACh injecting. There was a good correlation between MBF and the PI, Tp and T1/2 derived from MCE. The correlative 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 failure. Preventing the changes of MCE time-intensity plots before and after administration of ACh may enable the noninvasive in vivo assessment of endothelial structure and function in the clinical setting.

### 1188-54 A Novel Method for Estimating a Normalized Value of Myocardial Blood Volume by Compensating for the Attenuation of Incident Ultrasound in Contrast Echocardiography

**Satoshi Yamada, Keoru Komuro, Taisel Mikami, Keiko Nishihara, Hsao Onozuka, Akira Klatahate, Hokkaido University Graduate School of Medicine, Sapporo, Japan, College of Medical Technology, Hokkaido University, Sapporo, Japan.**

**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 MBF. 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 intracavitary 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) images obtained in 10 normal volunteers.

**Methods:** Using SONOS 5500 and 33 probe (Phillips), intermittent HPD images in the left ventricular short axis plane were acquired in each of 10 healthy volunteers with 16 cardiac cycles during continuous infusion of Levovist (3 or 4 ml/min), and 5 consecutive images were stored. On each HPD image, the amplitude of backscatter from the anterosurface (AmpAS) and that from the region of interest placed at the right ventricular cavity nearby the anteroseptal area were measured in decibels, and the ratio (myocardium/blood area) of amplitudes (RelASP) was calculated by subtracting the value in blood area from that in myocardium in decibels. Also in the posterior wall, the ratio of amplitudes (RelASP) was calculated by subtracting the value in the left ventricular cavity adjacent to the posterior wall from that in the posterior wall (AmpAS). These images were measured in 30 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±2.0 dB, p<0.0001), RelASP was similar to RelASP (-1.4±1.3 vs -1.9±1.4 dB, p=0.17). Since the blood volume and relaxed blood area is 10.8±1.0 (100±7)/cm³, the blood volume in the anteroseptal and that in the posterior wall were estimated to be 4.78±1.53 and 4.27±1.33 ml/100cm³ from RelASP and RelASP.

**Conclusion:** Measurement of the ratio of amplitude of backscatter from the myocardium to that from the intracavitary 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 Nicardipin 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 Hiryama, Yasushi Kashigawa, Sachiko Yagura, Tatsutomi Toshita, Toshihiko Asanuma, Shintaro Beppu, Osaka University, Suita, Japan.**

**Background and Purpose:** Collateral circulation of microvessels is important for salvage of 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 effects of nitroglycerin (NTG) and nicardipine (NEC) 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 NTG and NEC (100 μg/ml/min) infusions and NTG (101.0-20 μg/ml/min) in 8 open-chest dogs having good collateral circulation. Presence of collateral flow was determined by specific dye release after coronary occlusion followed by bubble destruction. The left circumflex artery (LCX) was completely occluded and contrast echo video intensity (TVI) (256 gray scale) of the area at risk was examined at control, during NTG (0.01-0.02 μg/ml/min) and NIC (0.01-0.02 mg/ml/min) infusions. 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 (80±21 mg/ml) and NEC (81±18 mg/ml) 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 TVI 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 18.6±14.3 ml/min), while not after NTG (12.7±5.7 ml/min to 14.5±12.6 ml/min).

**Conclusions:** Nicardipin 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

**Hideo Hiryama, Kazushi Kitamura, Kentaro Ohtani, Juri Okazaki, Yasushi Kashigawa, Sachiko Yagura, Tatsutomi Toshita, Akiko Iwata, Toshihiko Asanuma, Fuminobu Ishikura, Shintaro Beppu, Osaka University, Suita, Japan.**

**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 diseases. We examined the feasibility of intravenous myocardial contrast echocardiography (MCE) in mice.

**Methods:** Open chest mice (weight 38-41g) 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 (5-15MHz). Microsphere (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 18.6±14.3 ml/min), while not after NTG (12.7±5.7 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.

**Conclusion:** In each mouse, myocardial opacification in the ischemic area, and the non-opacified and whole left ventricular wall areas were measured and its ratio was calculated. The ratio was compared with those from Evans Blue stain.

**Methods:** In each mouse, myocardial opacification in the ischemic area, and the non-opacified and whole left ventricular wall areas were measured and its ratio was calculated. The ratio was compared with those from Evans Blue stain.

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

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