901-28 Dilated Cardiomyopathy Created by Chronic Rapid Pacing Induces Heat Shock Proteins and Limits Myocardial Infarction in Dogs

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It is not known whether chronic rapid pacing preconditions the myocardium against infarction. Twenty seven dogs underwent chronic rapid pacing (240–250 beat per minute) for 4–5 weeks. Eechocardiography revealed progressive decline in ejection fraction, wall thinning and increase in ventricular dilation. Four pairs crystals were sutured onto the anterior and posterior segment of the left ventricle to monitor systolic segmental shorting and wall thickening and ventricular balloon-tipped catheter pressure transducer (Millar). The left anterior descending (LAD) coronary artery was occluded for 45, 60 or 90 min and reperfused for 4 hours. Normal dogs were used as control and subjected to the same ischemic and reperfusion protocols. Color microspheres were used to determine collateral blood flow during ischemia. Myocardial biopsies were obtained to determine adenine nucleotide and nucleoside. Tissue samples were also obtained at baseline and at the end of reperfusion from normal, dilated hearts to determine the induction of heat shock protein expression using Western blot. Myocardial infarction and area at risk were measured using Monastral blue and TTC stain at postmortem.

Myocardial Infarction After 90 min Ischemia and 4 hrs Reperfusion

	Area at Risk	INF/AR
Control Group	46.59 ± 4.55	32.10 ± 2.90
Dilated Group	50.63 ± 7.41	19.70 ± 0.72*

*p < 0.05 vs. Control group, ANOVA, n = 7–9.

Myocardial INF/AR were 1.95 ± 1.50 and 8.50 ± 1.38 in the dilated hearts after 45 or 60 min ischemia and reperfusion, respectively ($p < 0.05$ vs. control group 21 ± 3.2 and 27 ± 3.6, respectively). Segmental systolic shortening and wall thickening were improved in the dilated hearts compared to normal myocardium. It is concluded that chronic rapid pacing stresses the myocardium, reduces the rate of ATP depletion during sustained ischemia, induces HSP 70 and improves myocardial contractility in this canine model of infarction.

CARDIOVASCULAR ANGIOGRAPHY/CT/MRI

901-29 What Is the Most Effective Vascular Approach for a Diagnostic Cardiac Catheterization? A Randomized Trial Using the Femoral, Brachial or Radial Approaches

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Cardiac catheterization in the outpatient setting using a femoral approach has been proved to be safe. However, prolonged periods of post catheterization bed rest, activity restriction and the need for longer use of a nursing care facility are still significant limitations of this approach. The purpose of this study was to determine whether brachial and/or radial percutaneous approaches compare favorably with the classical femoral approach. From 7/94 to 6/95, 429 patients (p) referred for coronary angiography were randomized to a femoral approach (141 p), brachial approach (150 p) or radial approach (138 p). Mean age was 63 ± 10 years and 73% were male gender. Baseline clinical characteristics were similar in the three study groups. In 7 p (5%) of the femoral group, 14 p (9.3%) of the brachial group and 32 p (23%) of the radial group, the procedure was performed or completed using a different approach than the initially designated (p: 0.001). Results are in the table.

	Femoral	Brachial	Radial	P value
Lab time (min)	48 ± 14	56 ± 17	56 ± 19	0.0001
Arterial time (min)	23 ± 9	28 ± 12	32 ± 15	0.0001
Fluoro time (min)	7.0 ± 5	8.5 ± 6	8.4 ± 7	0.02
Time to ambulation (min)	251 ± 78	21 ± 13	17 ± 7	0.0001
Time to discharge (min)	276 ± 78	73 ± 24	60 ± 16	0.0001
Significant pain (%)	1.8	1.2	8.7	0.02
Loss of Pulse (%)	0	2.5	9.6	0.02
Large hematoma (%)	2.3	2.4	0	NS

Conclusion: 1) Either approach appears to be safe, with low incidence of complications. 2) The brachial or radial approaches are good alternatives, with shorter time to ambulation and shorter hospital stay, with the potential to reduce the procedure cost. However, these approaches are more technically demanding, requiring longer procedures and increased radiation exposure. Radial approach was more painful and showed increased rate of vascular occlusion. In addition, in about 20% of the cases, another vascular access is needed.

901-30 Intravascular Magnetic Resonance Imaging Accurately Quantifies Human Aortic Atherosclerosis

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Intravascular magnetic resonance imaging (IVMRI) may represent an excellent tool in defining atherosclerotic plaque dimensions and composition. In an autopsy study, we isolated sections of thoracic aorta from 7 patients with varying degrees of atherosclerosis. The specimens, distended at 30 cm water pressure, were imaged by a radiofrequency catheter coil built in-house for intravascular imaging. Serial images at 5 mm intervals acquired on a GE Signa 1.5T magnet, TR/TE 1500/80 ms, 270 × 270 μm pixel, 3 mm slice thickness, 2 NEX were compared to conventional MR images from a 3-inch surface coil (SCMRI) placed directly under the specimens, and to digitized images of the corresponding histopathologic slices. Cross-sectional and luminal areas, defined by the total area circumscribed by the intima/media and intima/lumen interfaces respectively, were measured by two independent observers in 49 sites. Stenoses were calculated as the percent difference between the cross-sectional and luminal areas, corresponding to the plaque area.

Stenoses measured by IVMRI and pathology were similar (mean difference = −0.004 cm^2, 95% CI −0.029–0.021, NS) despite tissue fixation for pathologic studies. This was explained by the good correlation between IVMRI and pathology on measures of cross-sectional area ($r = 0.88$) and luminal areas ($r = 0.88$). As expected, the correlation between IVMRI and SCMRI was very strong for cross-sectional ($r = 0.95$) and luminal area ($r = 0.91$). Stenoses calculated by the two methods did not differ (−0.007 cm^2, NS). The extent and location of lipid intra-plaque deposition in T2 weighted images was also similar by IVMRI and SCMRI. Plaque calcification, defined by signal void, was mild in 4 specimens, moderate in 2 and severe in 1. Grades were identical in IVMRI and SCMRI. Thus, IVMRI images atherosclerosis as well as MRI obtained from a surface coil directly applied to the vessel of interest which is not feasible *in vivo*. In conclusion, intravascular MRI can accurately quantify human atherosclerotic plaque extent and composition.

901-31 Intravascular Quantification of Human Atherosclerotic Burden: Magnetic Resonance Imaging Versus Ultrasound

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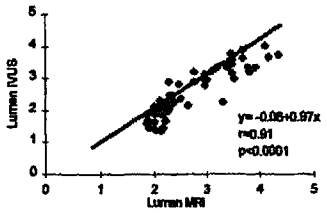
An accurate non-invasive quantification of the extent of atherosclerosis could provide a means of monitoring the impact of strategies to retard the progression and/or induce regression of atherosclerotic disease. We compared cross-sectional area (CSA), intraluminal area (ILA) and percent stenosis measured by intravascular ultrasound (IVUS), 12.5 Mhz, 6.2 Fr., and intravascular magnetic resonance imaging (IVMRI) in seven human post-mortem thoracic aortas. Specimens were imaged under distension at 30 cm water pressure. IVMRI was performed with a novel homebuilt intravascular receiver coil (GE Signa 1.5 T, 270 × 270 μpixel, slice thickness 3 mm, TR/TE 1500/80 ms). CSA and ILA defined as the total area circumscribed by the intima/media and lumen/intima interfaces respectively, were measured by 2 independent observers at 63 sites. Percent stenosis, calculated as CSA-ILA/CSA × 100, was more accurately measured by IVMRI (0.16 ± 0.09% vs. 0.17 ± 0.12% by pathology, NS), but was overestimated by IVUS (0.20 ± 0.13 vs. 0.17 ± 0.12% by pathology, $p < 0.04$). CSA measured by IVUS and IVMRI were similar (3.3 ± 1.1 vs. 3.2 ± 0.8 cm^2 NS, $r = 0.85$, $p < 0.001$) but ILA by IVUS was systematically lower than by IVMRI (2.5 ± 0.8 vs. 2.7 ± 0.7 cm^2, $p < 0.001$), despite excellent correlation ($r = 0.91$, $p < 0.001$, see Figure).



In conclusion, aortic atherosclerotic burden can be assessed by IVUS or IVMRI. However, IVMRI is superior to IVUS in the quantification of aortic atherosclerotic stenosis because of its greater ability to resolve the lumen/intimal interface.

SUNDAY POSTER