Comparison of Radiofrequency Lesions in the Canine Left Ventricle Using a Saline Irrigated Electrode Versus Temperature Control

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The maximum power deliverable by present radiofrequency (RF) ablation systems is limited by an impedance rise which occurs when the temperature at the electrode-tissue interface reaches 100°C. The limitation in power limits the depth and diameter of the lesion. The present method to avoid an impedance rise and maximize power delivery utilizes a thermistor in the ablation electrode. The power is varied to maintain a target temperature and prevent the temperature from exceeding 90-95°C (temperature control approach-TC). An alternative approach utilizes saline irrigation of the ablation electrode (active cooling) to prevent an impedance rise at high power (IR approach). The purpose of this study was to compare LV lesion size produced by the IR and TC approaches. In 15 anesthetized dogs (18-22 kg), a 7F deflectable catheter with a lumen and 5 mm tip electrode containing a ther­
mistor and 6 Irrigation holes (located radially, 1 mm from tip) was inserted into a carotid artery and advanced to the LV under fluoroscopic guidance. RF current was applied at one site by manually controlling voltage (30-80 V) to maintain the electrode temperature at 80-90°C (TC) and at a second site into a carotid artery and advanced to the LV under fluoroscopic guidance. Based on this algorithm and initial experience with catheter ablation of RVOT-VT, we hypothesized that most RVOT-VTs originate from a limited area in the RVOT, corresponding to the mid to anterior and superior RVOT septum just below the pulmonic valve (sites 2-3). To test this hypothesis, we documented fluoroscopically the site of identical pace-maps and successful radiofrequency (RF) catheter ablation of RVOT-VT in 14 con­secutive patients (12 female; ages 23-66 years). All patients presented with palpitations and/or presyncope and left bundle branch block/inferior VT with fast VTs are less easily ablated, not entirely related to hemodynamic toler­
ance. We performed radiofrequency CA in 25 patients (pts) who pre­
sented with sustained uniform VT, with the intent of eliminating all inducible uniform-morphology VTs (not just "clinical" VTs). CA was performed during 94 distinct VTs; 65 of these [69%] could not be induced thereafter. In individual­
pts, success of CA was defined as complete (absence of any inducible uniform VT) or partial (elimination of some but not all VTs). Results among the 25 pts:

<table>
<thead>
<tr>
<th>Success</th>
<th>#VTs/Pt</th>
<th>Procedure Time (min)</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>17 (80%)</td>
<td>3.0 ± 0.8</td>
<td>320 ± 108</td>
</tr>
<tr>
<td>Partial</td>
<td>5 (20%)</td>
<td>6.4 ± 4.0*</td>
<td>306 ± 175</td>
</tr>
<tr>
<td>Failure</td>
<td>2 (12%)</td>
<td>3.7 ± 2.9</td>
<td>243 ± 119</td>
</tr>
<tr>
<td>P value</td>
<td>0.60*</td>
<td>NS</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Conclusion: In most patients with RVOT-VT, the site of successful RF catheter ablation was the mid to anterior aspect of the RVOT septum. These findings may simplify the approach to RF catheter ablation of RVOT-VT and thus decrease fluoroscopic exposure in these patients.

Preconditioning and Stunning

Monday, March 20, 1995, 10:30 a.m.—Noon
Ernest N. Morial Convention Center, Room 61

Preconditioning Ischemia Time Determines the Degree of Glycogen Depletion and Infarct Size Reduction in Rat Hearts

Vania Barbosa, Richard E. Sievers, Christopher L. Wolfe. University of California San Francisco, San Francisco, CA

Infarct size reduction after ischemic preconditioning has been reported as an all-or-nothing response, with a threshold of 2 to 5 min of preconditioning ischemia time. Furthermore, infarct size reduction is associated with glyco­
gen depletion before prolonged ischemia. We sought to determine whether increasing preconditioning ischemia time results in progressive myocardial glycogen depletion and infarct size reduction and if so, whether infarct size reduction correlates with glycogen depletion before prolonged ischemia. Therefore, ventilated rats underwent a single episode of preconditioning is­
Adenosine-mediated Myocardial Protection During Preconditioning is Abolished by K<sub>ATP</sub> Channel Blockade in Rats

John G. Kingma Jr., Mette Hazenberg, Denis Simard, Jacques R. Rouleau.

The anti-ischemic effect of ischemic preconditioning (PC) is partly due to adenosine receptor-mediated opening of K<sub>ATP</sub> channels. PC-mediated protection may be potentiated by exogenous infusion of adenosine receptor agonists. To test this hypothesis, pentobarbital anesthetized rabbits (n = 8/group) underwent two cycles of 5 min regional ischemia and 5 min coronary reperfusion (REP). PC hearts received either adenosine (AD; 0.01 mg/min); cyclopentyladenosine (CP; A<sub>1</sub> receptor agonist; 0.001 mg/min) or CGS 21680 (CG; A<sub>2</sub> receptor agonist; 0.01 mg/ml). I.V. for 65 min starting 5 min before onset of REP. PC hearts were blocked with i.v. glibenclamide (G; 0.15 mg/kg) 10 min before PC or in the presence of AD, CP or CG. Infarct size (IS) was normalized to R. IS in absolute controls (i.e., no PC) was 51 ± 6% (mean ± SEM).

PC        G + PC        AD        G + AD        CP        G + CP        G + CG
R         1.6 ± 1.83 ± 0.2 1.6 ± 0.2 1.4 ± 0.1 1.9 ± 0.1 1.4 ± 0.3 2.0 ± 0.2 1.2 ± 0.1
IS         19 ± 2 39 ± 7 27 ± 7 37 ± 6 12 ± 1 44 ± 9 22 ± 3 50 ± 5

*p < 0.05; one-way ANOVA and SNK multiple range test

Cardiodynamics were similar for the treatment groups; but heart rate-blood pressure product was lower (< 0.05) during CP infusion. Conclusions: 1) PC markedly reduced IS; 2) PC-mediated protection was not potentiated with exogenous AD, CP or CG; and 3) G abolished PC-mediated protection with/without exogenous AD, CP or CG. These data indicate that adenosine receptor activation and opening of K<sub>ATP</sub> channels are involved in PC.

Calcitonin Gene-related Peptide Improves Recovery From Reversible Myocardial Ischemia

Ravi N. Samy, Scott C. Silvestry, B. Zane Atkins, James W. Davis, R. Eric Ulliy; David C. Sabiston, Jr., Donald D. Glover. Duke University, Durham, NC

Calcitonin gene-related peptide (CGRP) has been found to have inotropic properties and a short half-life. CGRP has been demonstrated to reduce ischemic injury in tissue flaps as well as to increase coronary artery flow. This suggests that preconditioning does not prevent but accelerates ventricular fibrillation in pig hearts; a decrease of the fibrillation threshold and a shortening of monophasic action potential duration during the first minutes of the sustained ischemia.