tenance of arrhythmias. We have used video imaging to study the role of atrial structure and wave front curvature on activation patterns and reentry. We recorded transmembrane potentials simultaneously from over 20,000 sites (sampling rate, 120 or 240 frames/sec) on the epicardial surface of the right atrium (RA) of the Langendorff-perfused sheep heart. Isochrone maps were constructed during pacing and at the transition to atrial fibrillation (AF). During pacing (2 × threshold) at a basic cycle length (BCL) of 160 ms (near the effective refractory period), conduction velocity (CV) was 51 ± 10 cm/sec longitudinally and 32 ± 4 cm/sec transversely ($n = 4$, $p < 0.05$). During the transition to AF, reentrant waves often propagated around thin lines of functional block that were 3.7 ± 0.6 cm long. The mean BCL of these waves was 243 ± 60 ms ($n = 7$). Their CV, 25 ± 9 cm/s, was slower than longitudinal ($p < 0.005$) and transverse ($p < 0.05$) CV at BCL = 160 ms, indicating that the pronounced curvature of the wave front at the edge of the line of block resulted in a decrease of CV. The waves rotated completely around these lines of block, however, epicardial activation was absent for 78 ± 5 ms ($n = 7$) between beats. Such a discontinuity suggested that transmural and endocardial pathways made up part of the reentrant circuit. Thus we mapped the endocardial and epicardial surfaces of the isolated RA during pacing at high frequencies and at the onset of arrhythmias. The results show that the crista terminalis and pectinate muscles are sites of preferential propagation whose frequency dependence enables disparity between endocardial and epicardial activation, with appearance of local block at junctional and branching points and epicardial breakthroughs. Overall, the results indicate that slow conduction resulting from wave front curvature and preferred propagation along the pectinate muscles contribute to complexity in atrial arrhythmias.

3:15

716-6 Efferent Vagal Innervation of the Canine Atria

Chuen-Wang Chiou, Douglas P. Zipes. *Krannert Institute of Cardiology, Indianapolis, IN*

We determined the functional pathways of the right (RA) and left (LA) atria by measuring effective refractory period response (ΔERP) to bilateral vagal stimulation (VS, 20 Hz, 3–10 V, 4 ms) at the RA and LA free wall and appendages before and after epicardial phenol and radiofrequency ablation (RFA). Sustained atrial fibrillation (SAF, lasting > 30 min) was induced with burst pacing and perpetuated by VS before and after phenol or RFA. RFA was applied to encircle RA, IVC-LA junction (I-A) and medial SVC-sinus transversus junction (S-S) in group (gp) 1 ($n = 5$). Phenol, followed by RFA, was applied to the same areas in gp2 ($n = 6$). In gp3, RFA was applied to encircle LA followed by RA. In gp4, RFA was applied to encircle RA followed by RFA to S-S.

Results: In gp2, phenol encircling RA merely attenuated the response to VS, which was then eliminated by RFA ($p < 0.001$). The response to VS in both atria was eliminated in gpl (RA ΔERP from 56.1 ± 26 to 0.8 ± 3 ms, $p < 0.001$; LA ΔERP from 38.3 ± 21 to 0.7 + 2 ms, $p < 0.001$). RFA in gp3 denervated LA ($p < 0.001$) but did not affect RA, which was denervated only after RFA encircling RA ($p < 0.001$). In gp4, RFA encircling RA denervated RA ($p < 0.001$) and attenuated VS to LA, which was eliminated after RFA to S-S. RFA encircling RA eliminated the inducibility of SAF, whereas phenol encircling RA or RFA encircling LA did not.

Conclusion: Denervation of the RA also denervates the LA, but not vice versa. Efferent vagal fibers to the atria are located both subepicardially and subendocardially, probably streaming from SVC, IVC and right pulmonary veins (RPV), then projecting to RA and to the LA through the RPV, I-A and S-S. RA vagal denervation eliminates the inducibility of SAF..

717 Primary Angioplasty in the Community Setting

Monday, March 25, 1996, 2:00 p.m.–3:30 p.m.
Orange County Convention Center, Room F1

2:00

717-1 Community Practice of Primary Angioplasty for Myocardial Infarction

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Primary angioplasty (PA) has been proposed to be superior to thrombolytic therapy for myocardial infarction (MI). To determine if PA at the community level duplicates the results of the published trials, data from Health Plan patients (pts) who presented to 15 non-health plan community hospitals with MI was retrospectively analyzed. There were 37 consecutive pts (age 62.6 ± 11.0) who had PA. There were 18 anterior, 17 inferior, and 2 lateral MI's. A successful PA was achieved in 17 (46%) with a patent artery established and no recurrent ischemia at 1 week. Unsuccessful PA occurred in 20 (54%) resulting in completion of MI in 11 (55%), need for emergent coronary bypass in 9 (45%), recurrent ischemia within 1 week requiring repeat intervention in 2 (10%) and death in 1 (5%). There were 24 "high risk" pts (age > 75, anterior MI or cardiogenic shock) PA was successful in 12 (50%). Among 13 low risk pts, 5 (38%) had successful PA. Time intervals from the decision to perform PA to initial balloon inflation were available in 18 pts. The time was 121 ± 45 min (range 60–195) and in the successful pts it was 109 ± 44 min (range 60–180). Conclusions: 1) Results obtained in the community in this study do not approximate the results of the published trials. 2) There is an increased need for emergent coronary bypass surgery. 3) The prolonged time from decision to perform PA to the initial balloon inflation will result in loss of myocardium and a worse prognosis for the pt. 4) Major changes in the current practice patterns are needed to achieve the success rates of the published trials and other tertiary centers.

2:15

717-2 Angiographic Complications of Primary Angioplasty

Nawwar Mercho, Adel M. Eldin, Babar Shareef, James J. Glazier, Syed A. Abbas, Hans H. Bauer, Jeffrey A. Hirst, Francis J. Kiernan, Daniel B. Fram, Joseph F. Mitchel, Raymond G. McKay. *Hartford Hospital, University of Connecticut, Hartford, CT*

Despite recent studies documenting a high success rate for primary angioplasty for acute myocardial infarction, a significant percentage of patients have diminished distal coronary flow in the infarct-related artery following intervention. To assess acute angiographic changes associated with primary angioplasty, retrospective analysis was performed on the angiograms of 114 patients undergoing this procedure. All patients were treated within 12 hours of onset of symptoms and electrocardiographic evidence of infarction. No patient received thrombolytic therapy. The infarct-related vessel was the right coronary artery in 46 cases, the left anterior descending in 45 cases, the circumflex artery in 19 cases, and a saphenous vein graft in the remaining 4 cases. *Results:* Primary angioplasty was "successful" (i.e., final stenosis < 50%, no death, no emergency CABG) in 109 of 114 patients (96%), although final TIMI grade 3 flow was established in only 88% of patients. Quantitative coronary measurements (CMS system) demonstrated an increase in minimal lumen diameter from 0.35 ± 0.41 to 1.99 ± 0.41 mm and a decrease in % stenosis from 87 ± 16 to 35 ± 11% (both $P < 0.01$). Distal embolization was noted in 14 patients (12%), no reflow was noted in 19 patients (16.6%), and definite residual angiographic thrombus was noted in 4 patients (3.5%). *Conclusions:* Primary angioplasty is associated with a significant incidence of distal embolization, no reflow, and residual thrombus. These observations suggest that intracoronary clot remains a significant problem for pure mechanical dilation of the infarct-related vessel.

2:30

717-3 Influence of Door-to-Balloon Time on Mortality in Primary Angioplasty Results in 3,648 Patients in the Second National Registry of Myocardial Infarction (NRMI-2)

Christopher P. Cannon, Costas T. Lambrew, Alan J. Tiefenbrunn, William J. French, Joel M. Gore, Douglas Weaver, William J. Rogers, for the NRMI-2 Investigators. *Brigham and Women's Hospital, Boston MA*

Time to reperfusion is a crucial factor in thrombolysis for acute myocardial infarction, with evidence supporting the link between higher 90 minute (but