**Background:** 5HT4, a novel hormonal trigger to AF, acts upon 5HT4 receptors on human atrial myocytes which are linked to Gs proteins to increase heart rate. The role of the various 5HT4 receptor isoforms in the pathogenesis of arrhythmias is not understood. We postulated that expression of the ‘a’ and ‘b’ isoforms would correlate with left atrial size and determine AF post CABG. **Methods:** Right atrial appendage samples were harvested from 47 patients undergoing bypass surgery. Pre-operatively, a transesophageal echocardiogram had been undertaken in all patients; their underlying heart rhythm was documented and they were followed up after surgery until discharge. 21 patients maintained sinus rhythm (SR) throughout; 14 patients developed AF post operatively and 12 patients had established AF. Of these, 27 patients had normal left atrial diameters (<4.5cm), 12 mild-moderate dilatation (4.5-5.5cm) and 8 moderate to severe dilatation (>5.5cm). mRNA was extracted, purified and cDNA was synthesized using reverse transcriptase. Real time relative quantification PCR was carried out. **Results:** Our study showed ubiquitous ‘a’ and variable ‘b’ isoform expression. The expression of the ‘b’ isoform increased and that of the ‘a’ isoform decreased with left atrial dilatation. This switch correlated with post-operative and established AF. **Conclusion:** Left atrial dilatation modulates 5HT4 mRNA processing in favour of the ‘b’ isoform and this may not only predispose to AF post CABG but may also help perpetuate the arrhythmia.

**Presentation Hour:** 1:00 p.m.-2:00 p.m.

**Morial Convention Center, Hall G**

**Sunday, March 07, 2004, Noon-2:00 p.m.**

**1035**

**Novel Applications and Insights in Cardiac Pacing**

**1035-215**

**Rate Control by Coupled Pacing During Atrial Fibrillation Increases Myocardial Efficiency**

**Don W. Wallace, Hirotsugu Yamada, Zoran B. Popovic, William J. Kowalewski, Neil L. Greenberg, David O. Martin, Cleveland Clinic Foundation, Cleveland, OH**

**Background:** Paired stimulation is a powerful inotropic therapy. However, because it dramatically increases myocardial oxygen consumption (MVO2), this therapy has not been applied clinically. We previously demonstrated that coupled pacing (CP) significantly reduced ventricular rate of mechanical contraction (VRMC) and increased contractility during atrial fibrillation (AF). We hypothesize that reduction of the VRMC during CP will minimize the increase of MVO2 and improve myocardial efficiency (MyoEf) during AF.

**Methods:** In 9 anesthetized dogs, we applied CP to the ventricles during sinus rhythm (SR) and AF. Acute AF was induced and maintained by rapid atrial pacing. In order to determine MyoEF, we calculated external cardiac power (ECP) = measured mean aortic power (mAP) X mean aortic flow (mAF). MVO2 was calculated from measured coronary sinus flow (CSF) X O2 extraction from coronary perfusion during SR and AF just prior to and during CP (6 min periods). We defined myocardial efficiency as MyoEF = ECP/MVO2.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Paced-UnTreated</th>
<th>Paced-Candesartan</th>
<th>Paced-Enalapril</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP (day 3)</td>
<td>137±15</td>
<td>128±17</td>
<td>128±17</td>
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</tr>
<tr>
<td>eNOS</td>
<td>97±15</td>
<td>97±15</td>
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<td>97±15</td>
</tr>
<tr>
<td>MyoEf</td>
<td>110±15</td>
<td>110±15</td>
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<td>110±15</td>
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</tbody>
</table>

**Results:**

Our CP increased MyoEF during acute AF in contrast, MyoEF decreased during SR.

**Conclusions:** The bradycardic effect of CP during AF probably minimized the marked elevation of MVO2 that had been previously observed during paired stimulation. Thus, CP may be a clinically useful pacing therapy for rate control during AF.