Atenolol in hypertension: is it a wise choice?  
Lancet 2004;364:1684-9 (November 6)

**Study Type:** Meta-analysis

**Purpose:** Systematic review of the effect of atenolol on cardiovascular morbidity and mortality in hypertensive patients.

**Patients:** 17,691 patients; 9 trials

**Meta-analysis design:** randomized trials that assessed the effect of atenolol on cardiovascular morbidity or mortality in patients with primary HTN. Studies were identified through Medline, Cochrane, and personal communication with established researchers.

**Inclusion:** randomized controlled trials, trials for treatment of primary HTN, for predefined criteria - MI, stroke, cardiovascular death, also needed atenolol as first-line treatment in one of the treatment arms

**Exclusion:** 17 trials - 5 excluded due to atenolol as a combination drug, 3 excluded because atenolol was and add-on drug

**Drug:** atenolol

**Outcomes:** All-cause mortality, cardiovascular mortality, MI, stroke

1. **Is the meta-analysis valid?**
   
   **Primary Guides**
   a. Did the overview address a focused clinical question? yes
   b. Were the criteria used to select articles for inclusion appropriate? yes
   
   **Secondary Guides**
   a. Is it unlikely that important, relevant studies were missed? yes (they even looked at unpublished data)
   b. Was the validity of the included studies appraised? not sure from data presented
   c. Were the assessments of studies reproducible? yes
   d. Were the results similar from study to study? yes - most data was homogeneous

2. **What were the results?**

<table>
<thead>
<tr>
<th>Test for</th>
<th>Atenolol vs placebo</th>
<th>Atenolol</th>
<th>placebo</th>
<th>p-value</th>
<th>heterogeneity</th>
<th>ARR</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-cause mortality</td>
<td>13%</td>
<td>13.3%</td>
<td>NS</td>
<td>.45</td>
<td>.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular mortality</td>
<td>7.8%</td>
<td>8.0%</td>
<td>NS</td>
<td>.32</td>
<td>.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>7.2%</td>
<td>7.2%</td>
<td>NS</td>
<td>.62</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>8.0%</td>
<td>8.2%</td>
<td>NS</td>
<td>.29</td>
<td>.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test for</th>
<th>Atenolol vs other antihypertensives</th>
<th>Atenolol</th>
<th>Other agent</th>
<th>p-value</th>
<th>heterogeneity</th>
<th>ARI</th>
<th>NNH</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-cause mortality</td>
<td>8%</td>
<td>7.1%</td>
<td>NS</td>
<td>&lt;.05</td>
<td>.49</td>
<td>0.9%</td>
<td>111</td>
</tr>
<tr>
<td>Cardiovascular mortality</td>
<td>5.1%</td>
<td>4.4%</td>
<td>&lt;.05</td>
<td>.08</td>
<td>.08</td>
<td>0.7%</td>
<td>143</td>
</tr>
<tr>
<td>MI</td>
<td>4.6%</td>
<td>4.5%</td>
<td>NS</td>
<td>.03</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>5.5%</td>
<td>4.2%</td>
<td>&lt;.05</td>
<td>.63</td>
<td>.63</td>
<td>1.3%</td>
<td>77</td>
</tr>
</tbody>
</table>

3. **Will the results help me?**

   * The only study giving an advantage to atenolol was the HEP trial, which showed a 43% reduction in stroke (ARR of 3.6%, NNT = 28).
   * Atenolol has similar BP reductions as other agents in the comparisons.
   * Why might atenolol be different?
     1. low lipophyllic profile, reducing central penetration
     2. no long term studies in reducing LVH
     3. atenolol does not affect endothelial dysfunction as others
   * no study limitations presented

**Conclusion:** Atenolol is NOT a suitable first-line drug for hypertensive patients. It also challenges the fact that atenolol should not be a reference drug or gold standard in hypertension outcome trials. Atenolol reduced blood pressure but it did not change events.