Atenolol & Beta-Blockers for Primary Hypertension: Do They Perform Under Pressure?

Clinical Question: Are beta-blockers, particularly atenolol, as effective as other antihypertensive medications in preventing important outcomes in hypertensive patients?

Bottom-line: Atenolol is an inferior choice for blood pressure treatment. Other antihypertensive classes (ACEI/ARB, calcium-channel blocker, diuretic) should all generally be considered first before using beta-blockers in patients with uncomplicated hypertension.

Evidence:
- Multiple large meta-analyses have examined this question:
  - 2005 meta-analysis\(^1\) compared all beta-blockers against other antihypertensives (13 trials; 105,951 patients) over 2.7-10 years.
    - Beta-blockers versus all other antihypertensives:
      - Statistically significantly increased risk of stroke [Number Needed to Harm (NNH)=461].
      - No difference in myocardial infarction or death.
    - Atenolol versus non-beta-blocker antihypertensives:
      - Statistically significant increased stroke (NNH ~130) and death (NNH ~140).
  - Similar results in 2004 meta-analysis by same authors,\(^2\) Cochrane review,\(^3\) and newer meta-analysis.\(^4\)
    - Beta-blockers worse than ACEIs/ARBs, calcium-channel blockers, and diuretics.\(^4\)
  - 2006 meta-analysis\(^5\) stratifying trials by age subgroup found different effects when comparing beta-blockers to other antihypertensives:
    - <60 years: Relative risk 0.97 (0.88-1.07).
    - >60 years: Relative risk 1.06 (1.01-1.10).
  - Limitations: Age cutoff arbitrary and based on trial-wide mean age rather than individual-patient data, thus between-age difference could merely be due to chance or methodological differences between trials.
2014 meta-analysis found largely consistent results between atenolol and other beta-blockers versus other antihypertensives.\(^6\)

- Limitations: Atenolol was the beta-blocker taken by 75% of trial participants,\(^3\) multiple different comparator drugs from different classes pooled together.

**Context:**
- Guidelines recommend against beta-blockers as 1\(^{st}\)-line therapy for uncomplicated hypertension in general (UK\(^7\)) or specifically in patients >60 years (Canada\(^8\)), unless there are comorbid conditions which benefit from beta-blockers.
- Beta-blockers are highly effective agents in patients with other indications (such as post-myocardial infarction\(^9\) or heart failure with reduced ejection fraction\(^10\)).

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