
Relative efficacy of Beta-Nonselective and Beta1-Selective Adrenergic Blocking Agents in Primary Cardiac Arrest Risk Reduction in Patients with Prior Myocardial Infarction

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Background: In randomized clinical trials of patients with myocardial infarction (MI), long-term treatment with a non-selective beta-blocker decreases risk of sudden cardiac death, also known as primary cardiac arrest (PCA). It is unclear if long-term use of beta1-selective agents offers the same protection against PCA. Animal-experimental studies suggest that activation of the beta2-adrenergic receptor may play a role in increasing the risk of PCA. We therefore hypothesized that treatment with a beta-nonselective agent would be more protective against PCA than treatment with a beta1-selective agent in patients with prior MI.

Methods: Cases of out-of-hospital cardiac arrest among enrollees of an HMO in Western Washington State were identified via paramedic records and death tapes between the years 1980-1994. Control subjects were a stratified random sample of enrollees, stratified by index date, age, gender, and a marker of prior heart disease (treatment with digoxin and/or nitroglycerin). For this analysis, case (n = 144) and control subjects (n = 240) were restricted to those who had had a prior physician diagnosed MI, based upon a medical record review, and were treated with a beta-blocking medication at the index date, using information from a computerized pharmacy database.

Results: Cases were more likely than controls to have had two or more prior MI's, congestive heart failure, diabetes, and COPD, and to use loop diuretics and digoxin.. After adjustment for clinical characteristics, treatment with a beta-nonselective agent (propranolol or nadolol, n=228) was associated with a decreased risk of PCA compared with treatment with a beta1-selective agent (atenolol or metoprolol, n=156), adjusted odds ratio = 0.45, 95% confidence interval 0.23-0.87, p=0.017.

Conclusion: The findings of this observational study of relative efficacy of beta-adrenergic blocking agents suggest that treatment with nonselective beta-blockers was associated with a lower risk of PCA, when compared with beta-1 selective agents, in patients with prior MI.