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## ESMOLOL IN THE TREATMENT OF REFRACTORY POSTOPERATIVE ATRIAL FIBRILLATION AFTER CARDIAC SURGERY

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**Introduction:** Atrial fibrillation (AF) occurs after cardiac surgery in 10 % to 40 % of patients (1). It is associated with increased incidence of complications including stroke, hypotension, pulmonary edema and increased hospital length of stay (2). Atrial fibrillation after heart surgery is attributed to many factors including electrolyte imbalance, atrial ischemia, pericardial inflammation or effusion and high sympathetic tone. There are many preoperative risk factors for atrial fibrillation after cardiac surgery. Older age has consistently predicted a higher incidence of postoperative atrial fibrillation (3). Other risk factors include hypertension, congestive heart failure, preoperative atrial fibrillation, valvular disorders and left atrial size (4). Many drugs have been used for the treatment of atrial fibrillation. The control of the heart rate, anticoagulation and conversion to sinus rhythm are the goals of therapy. Esmolol is an ultra-short acting, B-adrenergic blocking agent. It is used primarily as a rate-controlling drug in the treatment of AF, but it has also properties to convert atrial fibrillation to sinus rhythm. The purpose of this study is to measure the rate of conversion of atrial fibrillation post-cardiac surgery with esmolol treatment after failed pharmacological (amiodarone) and/or electrical cardioversion. We also hypothesize that higher initial heart rate correlates with a successful cardioversion with esmolol.

**Methods:** In this retrospective database search we included 22 patients who had developed atrial fibrillation after open-heart surgery (CABG, valvular surgery) and received esmolol therapy after failed pharmacological and/or electrical cardioversion. The rate of success of cardioversion of atrial fibrillation to normal sinus rhythm with esmolol treatment was recorded. Initial heart rate before esmolol administration was collected from the database as well as preoperative risk factors for atrial fibrillation (age, sex, hypertension, congestive heart-failure, preoperative atrial fibrillation, valvular disorders and left atrial size). A univariate logistic regression model was used to determine if initial heart rate is a predictor of successful cardioversion with esmolol.

**Results:** 21 patients had CABG surgery and 1 patient had mitral valve replacement. Intravenous amiodarone therapy was given to 20 patients and electrical cardioversion was attempted on 21 patients; both without any success in cardioverting atrial fibrillation. 10-30 mg of esmolol in intravenous boluses (over 1 min) was used every 3-5 minutes. Esmolol therapy was discontinued if normal sinus rhythm was obtained or an adverse event such as hypotension (blood pressure <90 mmHg) or bradycardia (heart rate <50 beats/min) occured. The total maximum dose of esmolol used was 160 mg and the mean dose was 90 mg. 13/22 patients (59 %) converted to normal sinus rhythm after esmolol treatment and thus 9/22 (41 %) patients failed to convert. The 13 patients who converted to sinus rhythm had a mean initial heart rate of 155 beats/min and the 9 patients who failed to convert to sinus rhythm had a mean heart rate of 124. A univariate logistic regression analysis indicated a significant relationship between heart rate and successful cardioversion to sinus rhythm ($p = 0.016$), such that the higher the heart rate, the greater the probability of success of cardioversion. Figure 1 shows the relationship between heart rate and predicted probability of success of cardioversion, with 95 % confidence intervals.

**Conclusion:** Esmolol could be used as a cardioverting agent in atrial fibrillation post-cardiac surgery after failed pharmacological (amiodarone) and/or electrical cardioversion. Higher initial heart rate is predictive of successful cardioversion to sinus rhythm.

**References**

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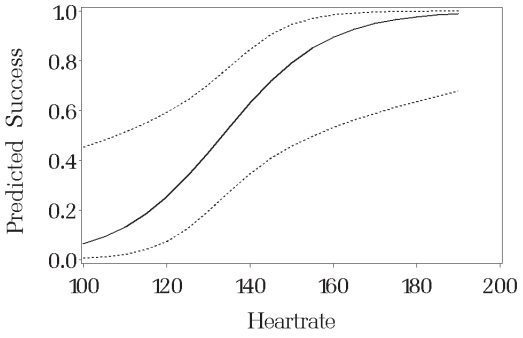


*Figure 1: Heart rate and predicted probability of success of cardioversion.*