

## Relationship between Different Heart Rate Control Levels and Risk of Heart Failure Rehospitalization in Patients with Persistent Atrial Fibrillation: A Retrospective Cohort Study

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**Abstract :** Background: Persistent atrial fibrillation is a common arrhythmia closely related to heart failure. Heart rate control is an essential strategy for treating persistent atrial fibrillation. Still, the understanding of the relationship between different heart rate control levels and the risk of heart failure rehospitalization is limited. Objective: The objective of the study is to determine the relationship between different levels of heart rate control in patients with persistent atrial fibrillation and the risk of readmission for heart failure. Methods: We conducted a retrospective dual-centre cohort study, collecting data from patients with persistent atrial fibrillation who received outpatient treatment at two tertiary hospitals in central and western China from March 2019 to March 2020. The collected data included age, gender, body mass index (BMI), medical history, and hospitalization frequency due to heart failure. Patients were divided into three groups based on their heart rate control levels: Group I with a resting heart rate of less than 80 beats per minute, Group II with a resting heart rate between 80 and 100 beats per minute, and Group III with a resting heart rate greater than 100 beats per minute. The readmission rates due to heart failure within one year after discharge were statistically analyzed using propensity score matching in a 1:1 ratio. Differences in readmission rates among the different groups were compared using one-way ANOVA. The impact of varying levels of heart rate control on the risk of readmission for heart failure was assessed using the Cox proportional hazards model. Binary logistic regression analysis was employed to control for potential confounding factors. Results: We enrolled a total of 1136 patients with persistent atrial fibrillation. The results of the one-way ANOVA showed that there were differences in readmission rates among groups exposed to different levels of heart rate control. The readmission rates due to heart failure for each group were as follows: Group I (n=432): 31 (7.17%); Group II (n=387): 11.11%; Group III (n=317): 90 (28.50%) (F=54.3, P<0.001). After performing 1:1 propensity score matching for the different groups, 223 pairs were obtained. Analysis using the Cox proportional hazards model showed that compared to Group I, the risk of readmission for Group II was 1.372 (95% CI: 1.125-1.682, P<0.001), and for Group III was 2.053 (95% CI: 1.006-5.437, P<0.001). Furthermore, binary logistic regression analysis, including variables such as digoxin, hypertension, smoking, coronary heart disease, and chronic obstructive pulmonary disease as independent variables, revealed that coronary heart disease and COPD also had a significant impact on readmission due to heart failure (p<0.001). Conclusion: The correlation between the heart rate control level of patients with persistent atrial fibrillation and the risk of heart failure rehospitalization is positive. Reasonable heart rate control may significantly reduce the risk of heart failure rehospitalization.

**Keywords :** heart rate control levels, heart failure rehospitalization, persistent atrial fibrillation, retrospective cohort study

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