# [Improvement in ventricular function with rhythm control of atrial arrhythmias may delay the need for atrioventricular valve surgery in adults with congenital heart disease.](https://www.ncbi.nlm.nih.gov/pubmed/31385437)

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**Take Home Points:**

* Atrial arrhythmias in ACHD patients is known to increase with age, disease severity and hemodynamic burden (i.e. atrioventricular valve regurgitation - AVVR).
* Improvements in hemodynamic burden can reduce arrhythmia burden but not always due to adverse atrial remodeling.
* Rhythm control of atrial arrhythmias in ACHD patients with moderate to severe AVVR resulted in improved ventricular function – increase in LV EF of ~5% or reduction of 1 grade of qualitative RV function severity.
* Overall, rhythm control was superior to rate control for avoidance of surgery at 4 years (89% vs 33%).
* Use of catheter ablation and/or AADs for rhythm control resulted in a reduction in arrhythmia burden of 67% (no recurrence or conversion from persistent to paroxysmal) in this cohort.
* Overall recurrence of arrhythmias still remained high at 75%.
* Atrial arrhythmia management with the goal of rhythm control may provide an alternative treatment approach to delay the need for surgical intervention in a subset of patients.



***Comment from Dr. Akash Patel (San Francisco), section editor of Congenital Electrophysiology Journal Watch.***  Atrial arrhythmias are a common complication in patients with adult congenital heart disease and increase with age, lesion severity, and hemodynamic burden such as atrioventricular valvar regurgitation (AVVR). Correction of underlying hemodynamic burden (i.e. AV valve surgery) has classically been thought to improve arrhythmia burden but this is not always true due to adverse atrial remodeling. Conversely, it remains unclear if there is benefit of arrhythmia control for improvement on atrioventricular valvar regurgitation in ACHD patients which could potentially delay the need for AV valve surgery. This study aimed to assess the impact of rhythm control of atrial arrhythmias in AVVR in adults with congenital heart disease.

This was a retrospective single center study of all patients with adult congenital heart disease who were seen by both, electrophysiology and adult congenital heart disease specialists, with at least moderate to severe AVVR and atrial arrhythmias from January 2004 to July 2017. The rhythm control group was defined as those who underwent catheter ablation or on antiarrhythmic medications (Class I or Class III). The rate control group was defined as all others. Baseline clinical, arrhythmia, echocardiographic and follow-up data were included.

The study group included 24 patients who had at least moderate-severe AVVR out of 229 ACHD patients with atrial arrhythmias. There were 9 patients in the rhythm control group of whom 8 (89%) were free from valve surgery at last follow-up. There were 15 patients in the rate control group of whom 5 (33%) were free from valve surgery at last follow-up. See Figure Below.



The mean age of the cohort was 47 years with no difference in gender, age, congenital heart disease, lesion severity, prior operations, CEIDs, and comorbidities between the rhythm and rate control groups. See Table Below.



The most common cardiac diagnoses were atrial septal/ventricular septal defects (25%), tetralogy of Fallot (25%), D-TGA (17%), AV Canal (13%), Ebstein (8%), and other (13%).

The atrial arrhythmias were IART (58%), atrial fibrillation (58%),] focal atrial tachycardia (29%), and AVNRT (4%). There were significantly more patients with IART in the rhythm control group which is likely more amenable to antiarrhythmic therapies. The arrhythmias were paroxysmal (<7 days) in 38% and persistent (≥ 7 days or cardioversion) in 63%. There was no difference in average heart rate between the groups. See Table Below.



There was some form of recurrence (paroxysmal or persistence) seen in 75% overall with no difference between the rhythm and rate control groups. There was a significant reduction in arrhythmia burden in the rhythm control group, 6 (67%) vs. 3(20%), p =0.04. Reduction was defined as no recurrence or a decrease in pattern from persistence to paroxysmal.

The antiarrhythmics used in the rhythm control group included dofetilide (78%), amiodarone (44%), sotalol (33%), and propafenone (11%) with 1.8±1.1 antiarrhythmic drugs used.

Echocardiographic findings showed that baseline atrial sizes, ventricular sizes, ventricular function, and AVVR were the same in both groups. There was moderate to severe left atrial dilation in 46%, right atrial dilation 63%. There was tricuspid valve regurgitation in 79% and mitral valve regurgitation in 21% with moderate-severe regurgitation in 54% and severe in 46%. See Table Below.



Follow echocardiographic data at a mean of ~2 years showed overall atrial sizes, ventricular sizes, ventricular function, and AVVR were the same in both groups. There was moderate to severe left atrial dilation in 42%, right atrial dilation 63%. There was moderate-severe regurgitation in 38% and severe in 38%. See Table Below.



In the rhythm control group, the mean LV ejection fraction improved from 54.4 ± 12.4% to 60.0 ± 11.5%, p=0.02 and the mean RV systolic function improved ~ 1 grade classification, p=0.02. There was no significant change in LV ejection fraction or RV systolic function in the rate control group. (See Below). There was also no significant change in AVVR severity.



The overall AV valve operation and transplant free survival at 4 years was 88% in the rhythm group and 31% in the rate control group (log-rank p=0.04). See Figure Below.



This study demonstrates an association between rhythm control and a small but significant increase in ventricular function without change in AVVR severity. This was associated with the need for less AVV surgery in the rhythm control group (11% vs. 60%). Clearly, atrial arrhythmias are associated with increased comorbidities including heart failure. This study demonstrated that even a reduction in arrhythmia burden despite a high recurrence rate of 75% still resulted in change ventricular function and reinforces the importance of sinus rhythm and AV synchrony in the setting of moderate to severe AVVR.

This study raises an interesting option for patients with significant AVVR and adds to the data supporting the importance of rhythm control over rate control in ACHD patients.

Clearly more data is needed in a larger sample size to determine the impact on ventricular function as the change in this study was only noted ~5% increase in LV EF or qualitative RV function. In addition, it is unclear based on the sample size, if the impact would be the same for failing systemic RV vs LV in biventricular circulation, single ventricle (RV vs LV), or failing subpulmonary ventricle with concordant AVVR. In addition, it remains unclear the impact how the anatomic valve morphology plays in the tolerance of AVVR as this population skewed heavily toward tricuspid regurgitation (79% of total cohort). Finally, the type of arrhythmia such as atrial fibrillation which is less amenable to rhythm control vs flutter and impact of persistence vs paroxysmal arrhythmias requires further evaluation.

Management of atrial arrhythmias in ACHD patients is critically important to reduce associated comorbidities such as stroke, heart failure and death. Further improvements in ablation therapy may provide more long-term success and potentially could show even more benefit than was noted in this study in whom patients had a high recurrence rate.