# [Outcomes of Bioprosthetic Valves in the Pulmonary Position in Adults with Congenital Heart Disease.](https://www.ncbi.nlm.nih.gov/pubmed/31323213)

Egbe AC, Connolly HM, Miranda WR, Dearani JA, Schaff HV.

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**Take-Home Points:**

* This large single-institution study with longer term follow-up evaluated the durability of bioprosthetic pulmonary valve replacement in adult patients as well as risk factors for prosthetic valve dysfunction.
* Factors associated with prosthetic valve dysfunction included prior history of atrial fibrillation and greater than moderate right ventricular dysfunction.
* The use of vitamin K antagonists at the time of hospital discharge was associated with lower risk of prosthetic valve dysfunction.



***Commentary from Dr. Jeremy Herrmann (Indianapolis), section editor of Congenital Heart Surgery Journal Watch:*** This retrospective review adult patients who underwent surgical bioprosthetic pulmonary valve repair over an 18-year period at the Mayo Clinic evaluated at prosthetic valve dysfunction not simply as occurrences of reintervention but other hemodynamic parameters to more accurately gauge prosthetic pulmonary valve longevity. The authors defined prosthetic valve dysfunction as a peak valve velocity of >4 m/sec and/or severe pulmonary regurgitation. In all, 573 patients met inclusion criteria with a mean age 32 years at the time of valve replacement. Pericardial prostheses were most commonly used, and all valve types and parameters are listed in Table 2. Patients were followed for a mean 16.8 +/- 4.2 years.

Subsequent reintervention occurred in 201 patients (35% total; 192 surgical and 9 transcatheter valve replacement). Of these, 48 (9%) required another intervention. In all, 807 bioprosthetic pulmonary valves were implanted in 573 patients. The overall freedom from reintervention at 10 and 15 years was 83% and 61%, respectively. When looking at hemodynamic parameters, the average time-to-prosthetic valve dysfunction was 12.6 years with an incidence at 10 and 15 years of 27% and 48%, respectively. In the multivariable risk factor model, factors associated with prosthetic valve dysfunction included history of atrial fibrillation and greater than moderate right ventricular dysfunction. The use of vitamin K antagonists at the time of hospital discharge was associated with lower risk of prosthetic valve dysfunction.

This study with excellent long-term follow-up offers significant insight into the current phase of care of adult congenital heart disease patients who require ongoing right ventricular outflow tract reintervention. These data show that prosthetic valve dysfunction starts to become a significant factor 10-15 years after valve replacement. Patients with more significant right heart dysfunction may be at risk for earlier development of prosthetic valve dysfunction, though the reasons for this are not clarified in this study. Interestingly, the use of vitamin K antagonists may be helpful in improving valve durability like bioprosthetic valves inserted in left heart positions. It is unclear for how long this treatment occurred and whether patients were also treated with aspirin. Importantly, no cases of endocarditis are reported in this study.

This large series spans almost 20 years, and it is possible changes in surgical techniques and prosthetic materials may have affected prosthetic valve durability over the course of the study. Additional information about concomitant cardiac procedures at the time of pulmonary valve replacement (e.g., MAZE procedure, pulmonary arterioplasty, etc.) may be helpful for better understanding this patient group and other risks for later valve dysfunction. One significant omission may be the use of stentless porcine aortic root grafts, which is the preferred prosthesis for pulmonary valve replacement in adults at our institution. This highlights one of the major limitations of a single institution study as well as the need for more collaborative research efforts.

