# [A Low Residual Pressure Gradient Yields Excellent Long-Term Outcome After Percutaneous Pulmonary Valve Implantation.](https://www.ncbi.nlm.nih.gov/pubmed/31202951)

Georgiev S, Ewert P, Tanase D, Hess J, Hager A, Cleuziou J, Meierhofer C, Eicken A.

JACC Cardiovasc Interv. 2019 Aug 26;12(16):1594-1603. doi: 10.1016/j.jcin.2019.03.037. Epub 2019 Jun 12.

PMID: 31202951

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**Take Home Points:**

* TPVI is first line therapy for treating residual RVOT disease. TPVi achieves not only short-term success but also durable results.
* Pre-stenting prior to Melody valve implantation is important to ensure long-term valve function.
* It is essential to be aggressive in relieving RVOT obstruction as leaving the lab with significant residual stenosis is a risk factor for early valve failure.



***Commentary from Dr. Ryan Romans (Kansas City KS), section editor of Congenital Heart Disease Interventions Journal Watch:*** Persistent RVOT dysfunction is common following surgical treatment of many forms of congenital heart disease. Transcatheter pulmonary valve implantation (TPVI) was first performed in 2000 and has become the first line option for treating patients with RVOT obstruction and pulmonary insufficiency. Multiple studies have shown excellent short- and mid-term outcomes with the Melody valve and short-term outcomes with the Sapien valve. Longer term data are not yet available. Additionally, in the early experience with the Melody valve, the conduit was not routinely pre-stented. It is now standard practice to stent the RV to PA conduit or RVOT prior to Melody valve implantation as the stent the Melody valve is mounted on does not have adequate radial strength to protect the valve.

Georgiev et al report on their single center experience with TPVi. Data was collected over an 11-year period (2006-2017) on all patients who underwent TPVI, with follow up data obtained prospectively. There were 236 patients who underwent TPVi, with a median age of 18 years (range 4-78 years) and weight of 59 kg (range 19-118 kg). The majority of patients had tetralogy of Fallot (51%). The RV to PA conduits were mostly pulmonary homografts (69%), with 20% of patients having other types of valved conduits. 11% of patients had no conduit (such as in tetralogy of Fallot s/p transannular patch). The indication for TPVI was pulmonary stenosis in 42%, pulmonary insufficiency in 16%, and mixed disease (PS and PI) in 42%. Pre-stenting was performed in all but 8 patients. Melody valves were implanted in 220/236 patients (93%). Post-dilation with a high-pressure balloon was performed in 63% of patients. The mean residual RVOT gradient was 10 mmHg (range 0-39 mmHg). The large majority of patients had no residual PI, 42 had trivial PI, and 5 patients mild PI immediately post procedure.

Follow up data was obtained on 226 patients (96%), with a median of 3.9 years (range 2 months to 11 years). Overall survival was 96% at 5 years and 92% at 10 years. There was a total of 7 deaths during the study period. Two patients died due to procedural related complications (uncontained conduit rupture, left coronary artery compression) and the other 5 were thought to most likely be to arrhythmias. Surgery free survival was 92% at 5 years and 83% at 10 years. At the end of the study period, 17 patients had suffered valve failure (10 with stenosis after infective endocarditis, 7 with progressive stenosis). Of these, 11 patients had surgical valve replacement and 6 were treated with transcatheter valve in valve procedures. More than mild PI was seen in only 1 patient at 5 years and 2 patients at 10 years. Cox regression analysis was performed and showed that patients who were treated with a pre stent and left the cath lab with RVOT gradients <15 mmHg were more likely to survive with their original valve at 10 years (88% vs. 56%). Exercise testing was performed in 163 patients prior to TPVI, 150 patients 6 months after TPVi, and 68 patients 5 years after TPVi. This showed slightly improved exercise capacity immediately after TPVi. This was maintained at 5 year follow up.

TPVi is now first line therapy for treating residual RVOT disease. This study adds to the growing literature showing that the valves offer a durable result. Infective endocarditis remains a concern and is the primary reason for valve failure. The annualized risk of infective endocarditis was 1.9%. The authors highlight the importance of pre-stenting prior to TPVi with the Melody valve and ensuring minimal residual RVOT gradient to maximize valve longevity.