



# Stented bioprostheses in the pulmonary position - a single center retrospective study

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TABLE 1. Cohort characteristics.

Variables	Total cohort (N=94)
Male sex, n (%)	50 (53.2%)
Age at surgery, y, median (IQR)	27.5 (17.0-42.0)
Age <18, n (%)	25 (26.6%)
BSA, m2, median (IQR)	1.85 (1.57-2.04)
Original diagnosis, n (%)	
ToF	54 (57.4%)
PS	15 (16.0 %)
Ross (after AS/AR)	9 (9.6%)
other	16 (17.0%)
Number of prior surgical procedures, mean ± SD	1.0 ± 0.74
Repeated PVR, n (%)	5 (5.3%)
Indication for PVR, n (%)	
PR	62 (66.0%)
PS	17 (18.1%)
PR+PS	12 (12.8%)
Prosthetic valve thrombosis	2 (2.1%)
Endocarditis	1 (1.0%)
Type of prosthetic valve, n (%)	
Porcine	42 (44.7%)
Pericardial, internally mounted (PIM)	45 (47.9%)
Pericardial, externally mounted (PEM)	7 (7.4%)
Concomitant procedure, n (%)	29 (30.9%)
Valve size, mean ± SD	24.99 ± 1.37
CPB time, min, median (IQR)	109.0 (80.0-140.5)
Prosthesis failure, n (%)	14 (14.9%)
Prosthesis replacement, n (%)	12 (12.8%)
Interventional, n (%)	8 (8.5%)
Surgical, n (%)	4 (4.3%)
All-cause mortality, n (%)	8 (8.5%)
Early, n (%)	1 (1.1%)
Late, n (%)	7 (7.4%)

IQR, Inter-quartile range; ToF, Tetralogy of Fallot; PS, Pulmonary stenosis; AS, aortic stenosis; AR, aortic regurgitation; SD, Standard deviation; PVR, Pulmonary valve replacement.

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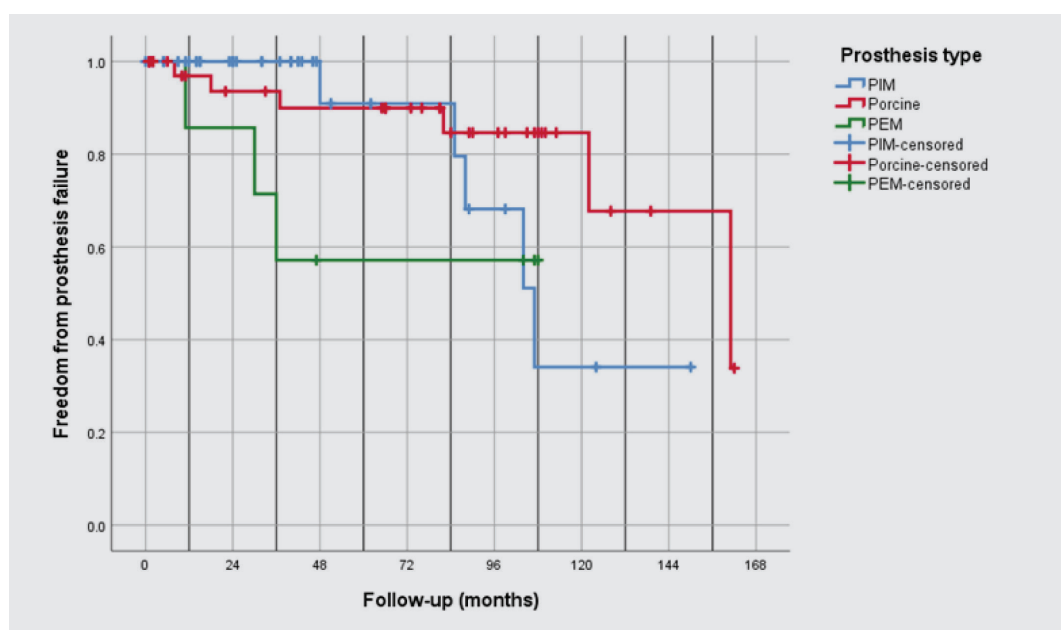


**Introduction:** Residual pulmonary regurgitation often occurs after Tetralogy of Fallot (ToF) correction, while homograft degeneration is common in patients with right ventricle outflow reconstruction using a homograft, such as in Rastelli or Ross procedures. Stented bioprostheses have long been used as a robust, off-the-shelf implant for surgical pulmonary valve replacement (PVR) in these situations<sup>1-3</sup>. However, optimal type of bioprosthesis in pulmonary position is a subject of debate. The aim of this study is to present our results with PVR using stented bioprostheses and to compare outcomes across prostheses types.

**Patients and Methods:** This is a single center retrospective study including all patients that underwent PVR with bioprostheses at University Hospital Center Zagreb from January 2010 to January 2025. Implanted valves were divided by type into pericardial-internally mounted (PIM), pericardial-externally mounted (PEM) and porcine. Three endpoints were defined: prosthesis failure (defined as maximum peak pulmonary valve gradient of 50 mmHg or severe pulmonary regurgitation), reintervention on the pulmonary valve and all-cause mortality.

**Results:** During the study period 94 PVRs were performed in 92 patients. Details are outlined in **Table 1**. Mean follow-up time was 146.1 months (95% confidence interval 134.5-157.8 months). The rates of freedom from pulmonary valve reintervention were 100%, 88% and 84% at 1, 2, and 5 years respectively. After dividing the cohort by valve types, Kaplan-Meier survival analysis was performed to compare time to endpoints between groups. Breslow test found statistical significance for prosthetic valve failure between the groups ( $p=0.036$ , **Figure 1**), while there was no significant difference for reintervention, or all-cause mortality. When comparing for prosthesis failure, PEM had shorter estimated mean times to prosthesis failure (72.7 months, 95% confidence interval (CI) 42.1-103.3), compared to PIM (111.1, 95% CI 89.1-133.2) and porcine prosthesis (136.5, 95% CI 117-156.1).

**Conclusion:** We have demonstrated that PVR with stented bioprostheses is a reproducible technique with good mid-term results in the complex population of patients with congenital heart defects. Our findings corroborate the results of other groups<sup>1-3</sup> and raise concern about the use of PEM for this indication.



**FIGURE 1.** Kaplan-Meier curve showing freedom from prosthesis failure across valve categories. PIM, Pericardial - internally mounted; PEM, Pericardial - externally mounted

## LITERATURE

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