

## Perioperative Uncontrolled Pulmonary Hypertension Alters Long-Term Function And Durability Of Right-Sided Homografts Implanted In Ross And Non-Ross Patients.

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**Objectives:** To date the potential role of pulmonary hypertension on outcomes of homografts used for right ventricular outflow tract (RVOT) reconstruction has not been evaluated. The objective of this study was to prove the deleterious role of both preoperative and postoperative pulmonary hypertension on long-term function and durability of homografts implanted in pulmonary position through a multivariate risk analysis in both Ross and non-Ross patients.

**Methods:** A retrospective study (1993-2009) included 222 consecutive patients who received homografts for RVOT reconstruction. Right ventricle (RV) and pulmonary artery (PA) pressures were measured by echocardiography before and after implantation with a mean follow-up of 5.3 years (6d.-17.9yrs). Median age at implantation was 12.5 years (4d.-67yrs). Main heart defects were aortic valve diseases (requiring a Ross procedure) (n=107, 48,6%), pulmonary atresia with VSD (n=40, 18%), truncus arteriosus (n=28, 13%). Endpoints were homograft stenosis (maximal echographic peak gradient  $\geq 20$ mmHg), regurgitation (grade at least moderate), dysfunction (maximal echographic peak gradient  $\geq 50$ mmHg or regurgitation at least moderate) and explantation. Univariate and multivariate Cox regression analyses were performed.

**Results:** Univariate risk analysis is presented in the table. The multivariate risk analysis confirmed that the preoperative mean pulmonary artery pressure  $>30$ mmHg is a significant risk factor for homograft stenosis (Hazard Ratio HR :5;  $p=0,01$ ), regurgitation (HR:3;  $p=0,02$ ) and explantation (HR:80;  $p=0,03$ ). A RV/LV pressure ratio  $>0,5$  at 8 months after implantation without any significant homograft stenosis is a multivariate risk factor for homograft dysfunction (HR:9, $p=0,002$ ).

**Conclusions:** Preoperative and postoperative pulmonary hypertension alters long-term function and durability of homografts implanted in pulmonary position both in Ross and non-Ross patients. A better control of the perioperative pulmonary artery pressure through surgical and medical measures could improve their durability.

Univariate risk analysis for HG-related events	homograft stenosis	homograft regurgitation	homograft dysfunction	homograft explantation
Preoperative risk factors	RV/LV pressure ratio $>0,4$ ( $p=0,001$ ) RV pressure $>40$ mmHg ( $p=0,005$ )	Mean PAP $>30$ mmHg ( $p=0,002$ ) RV/LV pressure ratio $>0,4$ ( $p=0,08$ ) RV pressure $>40$ mmHg ( $p=0,008$ )	Mean PAP $>30$ mmHg ( $p=0,005$ ) RV pressure $>40$ mmHg ( $p=0,01$ )	Mean PAP $>30$ mmHg ( $p=0,002$ ) RV/LV pressure ratio $>0,4$ ( $p=0,002$ ) Distal stenosis of pulmonary arteries
Immediate postoperative risk factors	Mean PAP $>30$ mmHg ( $p=0,02$ ) PA branch stenosis ( $p=0,03$ )	Pulmonary hypertension crisis ( $p=0,01$ )	RV pressure $>45$ mmHg at the end of CPB ( $p=0,01$ )	
risk factors at 8 months after implantation	Peak PAP $>49$ mmHg ( $p=0,03$ ) RV/LV pressure ratio $>0,5$ ( $p<10^{-3}$ )	Peak PAP $>49$ mmHg ( $p=0,01$ ) Distal stenosis of pulmonary arteries ( $p=0,005$ )	Distal stenosis of pulmonary arteries ( $p=0,02$ ) RV/LV pressure ratio $>0,5$ ( $p<10^{-3}$ ) Mean PAP $>30$ mmHg ( $p=0,04$ )	Mean PAP $>30$ mmHg ( $p=0,001$ ) RV/LV pressure ratio $>0,5$ ( $p=0,02$ )