A global real-world analysis comparing long-term outcome of Ross procedure to prosthetic aortic valve replacement in patients aged 18 to 60

Objective:
The choice of surgical procedure for valve replacement in non-elderly adults (age ?60 years) is challenging because of the prosthesis-related risks and the lifelong management of these young patients. Therefore, we aimed to perform a real-world analysis of young adults undergoing either Ross procedure or prosthetic aortic valve replacement.

Methods:
In this global retrospective real-world analysis using the federated global TriNetX database, we identified 11,382 patients in the TriNeTx database (June 2024) who underwent aortic valve replacement between the ages of 18 and 60. A total of 1,000 patients underwent the Ross procedure, 4,526 patients underwent biological aortic valve replacement (bAVR) and 5,856 patients underwent mechanical aortic valve replacement (mAVR). For outcome analysis, 1:1 propensity score matching was performed for age at surgery, ethnicity, and cardiovascular, pulmonary, renal, and hepatic disease, resulting in 978 Ross patients matched for bAVR and mAVR, respectively. The primary endpoint was all-cause mortality. Secondary endpoints were stroke, major bleeding, reoperation and endocarditis with up to 10 years of follow-up.

Results:
At 10 years, all-cause mortality was similar in the Ross group (2.4%) compared to 4.3% for mAVR (p=0.596) and 3.8% for bAVR (p=0.848). Compared to mAVR, the Ross procedure was associated with a significantly lower cumulative risk of bleeding (1.5% vs 6.3%; HR: 2.43; 95% CI: 1.35-4.37; p=0.002) and stroke (1.0% vs 4.3%; HR: 2.6; 95% CI: 1.28-5.45; p=0.007) at 10 years. The risk of endocarditis (1.9% vs 2.0%; p=0.350) and reoperation (1% vs 1,4%; p=0.208) was similar between Ross and mAVR. Compared to bAVR, the Ross procedure was associated with a significantly lower risk of stroke at 10 years (1.0% vs 3.1%; HR: 2.37 (95% CI: (1.12-5.01); p=0.020). The risks of reoperation (1.589% bAVR vs. 0.993% Ross; p= 0.337), bleeding (p=0.261) and endocarditis (p=0.145) were similar between Ross and bAVR.

Conclusion:
In our global real-world analysis, the Ross procedure was associated with a significantly lower risk of stroke compared to mechanical and biological AVR and a lower risk of bleeding events compared to mechanical AVR. This real-world analysis confirms the superiority of the Ross procedure in terms of valve-related complications compared to prosthetic AVR in patients younger than 60 years.

Johannes Petersen (1), Yousuf Al Assar (2), Evaldas Girdauskas (3), Cyrus Khandanpour (4), Hermann Reichenspurner (1), Theo Leitner (4), (1) University Heart & Vascular Center Hamburg, Hamburg, Hamburg, (2) University Medical Center Hamburg-Eppendorf, Hamburg, NA, (3) University Hospital Augsburg, Augsburg, Germany, (4) Department of Hematology and Oncology, University Medical Center Schleswig-Holstein (UKSH), Lübeck, NA

Additional Resources

-