Not All Created Equal: Mid-term Echocardiographic Follow up of Aortic Valve Replacement with a Biologic prosthesis

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Background: Different models of bioprostheses are used to replace the aortic valve in elderly patients. These valves differ in their long term outcome regarding durability and degeneration. The mid term follow up studies in the literature indicate similar outcomes for most of the models. The purpose of this study is to elucidate the mid term outcome of the bioprostheses used in our hospital.

Methods: Retrospectively collected information on consecutive patients undergoing aortic valve replacement with 5 models of bioprostheses from 3/2006 to 9/2008 who had follow up echocardiography in our hospital. The information collected included basic clinical parameters and intraoperative & follow up echocardiography parameters. Multivariate analysis was performed to compare the impact of the model used on mid term echocardiographic outcome.

Results: 104 patients were included, 50% were male The mean age was 73±9 years, patients receiving Magna prosthesis were significantly younger (63±10 years, $p<0.01$), average time to echocardiographic follow up was 122±195 days. Prostheses used were as follows: Magna in 21 patients, Perimount in 24, Mitroflow in 18, Hancock in 10 & Mosaic in 31. Diameters used were: 19mm in 15 patients, 21mm in 53, 23mm in 27 & 25mm in 9. Additional procedures were performed on 53 patients, including CABG on 47. There was no difference in peak systolic velocity across the valve in the intraoperative TEE. In follow up echocardiography the ratio of peak systolic velocity across the prosthesis to peak LV outflow tract velocity was 2.7 ± 0.5 for Magna, 2.4 ± 0.5 for Perimount, 2.8 ± 0.5 for Mitroflow, 2.8 ±0.4 for Hancock & 3.0 ± 0.6 for Mosaic with a significant difference between Perimount & Mosaic prostheses ($p<0.004$ in univariate analysis). A multivariate analysis of 89 patients with complete data was performed using Perimount data as a reference. We found that predictors of peak systolic velocity/peak LVOT velocity greater than 3 were: implantation of Mosaic prosthesis (OR 6.2, $p=0.012$), small diameter of the prosthesis (OR 0.6, $p=0.009$) and male gender (OR 5.4, $p=0.01$). When cohorts were separated according to gender, it was found that only male gender was predictive of a high ratio (OR 8.8, $p=0.021$).

Conclusion: Implantation of a Mosaic prosthesis in the aortic position in men is a predictor of an increased peak transvalvular gradient in mid term follow up. Long term results should be monitored carefully.