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Title: DEVELOPING A STRATEGY FOR POSTOPERATIVE TISSUE VALVE ADVOCACY IN A LOW-RESOURCE SETTING

Authors: Julie Carragher, Emmanuel Rusingiza, Ceeya Patton-Bolman, Leslie Kaze, Nikki Schulick, Songnan Wang, Evariste Ntaganda, Maurice Musoni, Yihan Lin

Background & Aims: Rheumatic heart disease is the most common cause of acquired cardiovascular disease in sub-Saharan Africa, including Rwanda. Patients with advanced disease often require surgical intervention, and various factors are considered when choosing between a mechanical heart valve (MHV) or a bioprosthetic valve (BPV), including age, sex, patient compliance, access to care, and desire for future pregnancy. Due to early structural deterioration and concerns for future re-operation, BPV patients warrant close follow-up, which can be challenging in low-resource settings. Here, we present data on follow-up status and surgical outcomes for 44 Rwandan patients with BPVs.

Methods: 221 Rwandan patients, all of whom are included for analysis, received valve replacement surgery by visiting teams such as Team Heart or were referred for surgery out of the country. Rwandan cardiology fellows and trained nurses performed echocardiography for 41 postoperative patients in February 2023. These images were reviewed by the cardiology fellows, then by cardiologists for final reporting. Results were exported to Microsoft Excel and STATA for analysis. In total, eight BPV patients with echocardiography results from February 2023 were included, in addition to one BPV patient who was imaged in August 2022 during her regular follow-up appointment. Categorical and continuous variables were compared using Pearson chi-squared (or Fisher's exact test) and independent T-test respectively. Before the presentation in November, visiting sonographers and cardiologists will perform echocardiography studies on the remaining 35 BPV patients which will be included in the final analysis.

Results: 20% of Rwandan patients with valve replacement surgery have at least one BPV implanted (44, n=221) between 2006-2022. There were more women with BPVs than MHVs (35 [80%] vs. 99 [56%], P=0.004116) and though both groups had similar age [IQR] at the time of surgery, when stratified by sex the women with BPVs were on average younger than those with MHVs (24 [19-28] vs. 26 [17-34], P=0.150081). Both cohorts were similar regarding the number of valves replaced (BPV 57% vs. MHV 53% single valve), which valves were replaced (BPV 67% vs. MHV 63% mitral), and country of surgery (BPV 77% vs. MHV 94% Rwanda). There was a slightly higher mortality rate among patients with at least one BPV compared to patients with only MHVs (8 [18%] vs 21 [12%], P=0.266695).

At the time of echo, the mean [IQR] years that had passed since surgery among those with BPVs was 11.7 years [11-14]. Eight (89%) BPV patients had at least mild pathology of their prosthetic valve, and three (33%) were reported to need urgent reoperation. Valve insufficiency was the most common abnormality among BPVs, with the majority having severe (3 [30%]) or moderate (3 [30%]) pathology. The majority of patients with BPVs had enlargement of at least one heart chamber (8 [89%]) including of the left atrium (5 [63%]), left ventricle (5 [56%]), and right atrium (2 [33%]). Severity of dilation ranged from severe (4 [33%]) to mild (4 [33%]) enlargement.

Conclusions: At least three patients with BPVs are in need of urgent re-operation, and this number will likely increase as we obtain updated echocardiography studies on the remaining patients. This research highlights the importance of evaluating valve integrity through routine echocardiography studies on BPV patients. Furthermore, in low-resource settings such as Rwanda, the opportunity for re-operation is small, as there are many patients in need and not enough access. Understanding the nature of BPV deterioration in this setting is an important factor to consider in addition to the desire for childbearing and number of anticipated repeat procedures when determining valve selection.