Clinical outcomes of children operated for rheumatic valvular heart disease followed-up at tertiary level of care in Rwanda.

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Rationale:

The exact outcomes and follow-up aspects of children who had open-heart surgery for rheumatic valvular heart disease living in developing countries are generally not known.

Objective:

To determine the outcomes and follow-up aspects of Rwandan children who have undergone open heart surgery for rheumatic valvular heart disease and highlight challenges to care in order to improve the overall domestic management of post-operative rheumatic heart valve disease among pediatric patients in Rwanda.

Methods:

A cross-sectional study was conducted at all four referral hospitals of Rwanda, which receive referred pediatric cardiology patients from all over the country. Only two hospitals (CHUK and KFH) had pediatric cardiologists based there; other hospitals had visits by visiting cardiologists on regular basis.

Study population included Rwandan children aged 18 years or less at time of surgery, who underwent surgery for rheumatic valvular heart disease from January1st 2006 to March 31st 2015. The recruitment of the cases was prospective in nature (April to June 2015), collecting all useful information, including pertinent patient characteristics and demographics. The files of the patients who died were reviewed in order to know the modality of death if this was applicable. Only those who agreed to consent for the study were enrolled and reviewed in outpatient and inpatient department by cardiologist. Cardiac ultrasound was done for each of them. The 2D and Doppler modes were used to assess the size of the heart structures and the velocities across the valves. The M mode was used to determine the systolic function of the heart. INR was checked for every patient with mechanical valves and 2 previous values were recorded in addition to the value of the day of consultation. The secondary antibioprophylaxis was reviewed for the last 3 months prior to the study.

The enrolled children and their caretakers had a semi-structured interview to assess their quality of life. To assess the quality of life, we used Ferrans and Powers Index, Cardiac IV version. Patient's demography and clinical and para-clinical data were entered in data collection sheets. A pretested, pre-coded and general questionnaire was used and crosschecked by the Principal Investigator to ensure completeness and validity before leaving the study.

The data entry was done using Epidata 3.1 computer software, analyzed using SPSS 20.0 and STATA 12.0 for windows, recording and presentation of results was done using Microsoft Excel and Microsoft Word. Qualitative variables were summarized as proportions, continuous variables as means and standard deviation. Bivariate regression analysis was done using Odds Ratios, 95% confidence interval was used to test for association of risk

factors and variables. The two-sided p value <0.05 was considered confirming statistically significant association or difference.

Results:

Sixty-nine patients were included in our study, aged between 8 and 24 years at the time of study, the mean was 15.5 years ±3.4 SD. At the time of surgery, the younger was 6 years old and the elder was 18 years old, the mean was 13.0 years ±2.9 SD. Female patients were 56.5%.

Majority of them were symptomatic before surgery (NYHA IV: 88.4%, NYHA III: 7.2%). Mitral valve regurgitation was predominant: 92.6%, aortic valve regurgitation: 20.5%. Tricuspid valve regurgitation was 29.4%. Mitral stenosis represented 14.7%.

The main surgical procedure done was mechanical valve replacement: mitral in 46 patients (66.7%), aortic in 8 patients (11.6%) tricuspid in 4 patients (5.8%). Biological valve replacement was done too: mitral in 6 patients (8.7%), aortic: 2 patients (2.9%) and tricuspid biological valve replacement in 4 patients (5.8%). Valve repairs: mitral in 13 patients (18.8%), tricuspid in 8 patients (11.6%) and aortic valve repair was done in 3 patients (4.3%). Most of children presented post-operative improvement (NYHA I: 59.4% and NYHA II: 27.5%). Post-operative follow-up was regular at 76.8%.

In post-operative follow-up, moderate to severe mitral valve regurgitation was found in 11 patients who underwent mitral valve repair; significant aortic regurgitation was found in 7 patients and aortic stenosis in 3 patients. Tricuspid regurgitation was found in 9 patients.

Warfarin dose ranged between 1 to 12.5 mg with mean of 6 mg±2.5 SD and was regularly taken in 75.5% people with mechanical valve. The main reasons to poor compliance were poor knowledge (50%), procurement problem (25%) and poverty (16.7%).

The INR ranged from 1 to 7.5 with mean of 2.53±1.25 SD and was regularly checked in 77.6% of children. The reason of poor irregular INR checking included poor knowledge 45.5%. The distance and INR machine problem contributed 18.2 % each.

In post-operative follow-up, the diuretics were still used in 26 among 69 patients, ACE inhibitors in 22 patients, beta-blockers in 16 patients, Aspirin in 9 patients and Digoxin in 4 patients. Secondary prophylaxis was mainly done using Benzathin Penicillin G monthly injections (69.6%). Compliance to monthly IM Benzathin Penicillin was 50% and 60% for daily oral Penicillin. The major reasons of poor compliance were generally poor knowledge at 74.2%, poverty and procurement problem at 9.7% each.

Six children (8.69%) died of end stage heart failure (3 patients) due to severe left ventricular systolic dysfunction and two patients for infective endocarditis. Quality of life was reported to be generally good after surgery.

Conclusion:

Even though it remains a big challenge in developing countries, rheumatic heart disease surgery in children is associated with good outcomes and satisfying quality of life. Regular education of the children and their families is needed to improve the adherence to care and follow-up.

Key words: Heart surgery, rheumatic heart diseases, outcomes, and children.