

## Rheumatic Valve Disease Surgery: Major Challenge in BURUNDI

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### Abstract

### Original Research Article

**Objective:** to show major challenge, concerns about rheumatic valve disease surgery in Burundi and medium term results. **Methods:** Included in our study, all patients whom the diagnosis of rheumatic heart disease had been made and underwent open heart surgery abroad. **Results:** Middle age= 24, 72 ±11.8 years, 33 (61.1%) patients were female. The average duration of the follow up=3.46±1.61years. Mitral valve was the most affected (92.59%). The main surgical procedure was mitral valve replacement performed to 47 (94%) patients. During the follow up, 3(5.5%) patients died. **Conclusion:** Surgical management of rheumatic heart disease remains a major challenge in Burundi. Six areas of concerns must be considered to develop a local technique plateau.

**Key words:** Rheumatic heart disease, valve disease surgery, challenge, concerns, Burundi.

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## I. INTRODUCTION

Rheumatic heart disease, an avoidable consequence of acute rheumatic fever, disproportionately affects the world's most vulnerable people. It is estimated that there are approximately 33 millions people living with rheumatic heart disease [1, 2]. Rheumatic heart disease is a major public health problem in developing countries. Although the poor socio-economic condition is to be blamed for the rampancy of the disease, the lack of advanced open heart surgery to treat rheumatic heart disease patients in developing countries played a pivotal role for the significant mortality and morbidity due to the disease [3]. In Burundi, there are no data relating rheumatic valve disease situation and surgical cardiac team doesn't exist.

This article aimed to show major challenge and areas of concerns to develop a technical plateau in response of rheumatic valve disease surgery requirements in Burundi, medium term surgical results of the patients who underwent an open heart surgery abroad (Sudan) and followed up by local cardiologists.

## II. PATIENTS AND METHODS

Are included in the current study, all patients who were diagnosed to have rheumatic valve disease and who underwent open heart surgery for the same

disease by the foreign cardiac surgical team at the Salam Centre for Cardiac Surgery in Khartoum, Sudan. Evaluation was done by certified and registered local cardiologists. Before sending patients to Salam Center in Sudan, the surgeon's cardiac team comes in Burundi and holds a routine discussion with local cardiologists on each patient and settles the diagnosis. After discharge, patients returned to Burundi to be followed up by the same cardiologists. Every year, echocardiography is done for each patient and surgeon's cardiac team comes to follow them up. Data were abstracted from the patient files kept by "LA MAISON DU BON SAMARITAIN DU BURUNDI" a local association dealing with the low or poor socio-economic people in the following up of their patients. Many pre, per operative and surgical technique data were not available. Data were analyzed by using IBM Statistical Package for Social Sciences statistics 21 multilingual. Findings were presented in text form and frequency table. The median value with its interquartile range and percentage values were determined for continuous and categorical variables, respectively.

## III. RESULTS

### Preoperative characteristics

As shown in Table 1 bellow, altogether 54 patients (median age=24.72±11.80) were included in the study and 33 (61.1%) of them were female. The

youngest and oldest patients were 9 and 60 years old, respectively. Pre-operatively, no patient was diabetic or hypertensive. As history of patients, one (1.85%) patient had stroke and another one had mitral valve replacement. All the 54 studied patients, most of them 50 (92.59%) had rheumatic mitral valve disease. Combined mitral and aortic valves lesion was seen in 15 (27.7%) patients. Only 5(9.25%) patients had isolated rheumatic aortic valve disease. Twelve (22.2%) patients had functional tricuspid valve regurgitation. Peroperative data: All the patients were operated abroad (Khartoum, Sudan). This is the major challenge to be taken up in Burundi.

As shown in the table 1, the valve replacement done was mitral valve replacement 47(94%) patients and aortic valves replacement 18 (90%) patients (double valve replacement was done to 15 patients). The valve replacement was done with mechanical prosthesis to all patients (100%). Mitral valve repair was done to 3(6%) patients, aortic valve repair to 2(10%) patients and tricuspid valve repair to 12(100%) patients. Following up: Average follows up was

3.46±1.61years. The electrocardiography showed sinus and regular rhythm in 42(77.8%) patients, atrial fibrillation in 10(18.5%) patients and atrio-ventricular block in 2(3.7%) patients.

Echocardiographic follow up showed proper functioning of mitral and aortic prosthesis in 100%; moderate residual leakage in 1(33.3%) patients and stenosis in 2(66.7) patients after mitral repair; moderate residual leakage in 2(16.7%) patients and severe residual leakage in 1(8.35%) patients after tricuspid repair. For aortic repair, two (100%) patients had moderate residual leakage. Left ventricular function was preserved in 48(88.9%) patients and 6(11.1%) patients had left ventricular dysfunction including one with severe dysfunction and right ventricular function was preserved in 52(96.3%). During the follow up, 7 (12.96%) patients had moderate pulmonary hypertension. In the overall of 54 patients, 3 (5.5%) patients died after stopping anticoagulation treatment and 3(9.09%) women became pregnant despite having mechanical prostheses.

**Table-1: Pre, per and post-operative data**

	Variables	N=54	Rate
	Age	24.72±11.80	
	Female	33	61.1%
Cardiovascular risks factors	Diabetics	0	0
	Hypertension	0	0
History	Stroke history	1	1.65%
	Mitral valve replacement	1	1.65%
Valve disease	Mitral	50	92.59%
	Aortic	20	37.03%
	Tricuspid	12	22.22%
Gestes	Mitral valve replacement	47	94%
	Aortic valve replacement	18	90%
	MV repair	3	6%
	AV repair	2	10%
	Tricuspid repair	12	100%
	Mitral annuloplasty	2	4%
Follow-up	Year	3.46±1.61	
Rythm	Sinus and regular rhythm	42	77.8%
	Atrial fibrillation	10	18.5%
	Atrio-ventricular block	2	3.7%
Echocardiography	Good function of mitral prosthesis	47	100%
	Good function of aortic prosthesis	18	100%
	Mitral repair: residual moderate leakage	1	33.3%
	: stenosis	2	66.7%
	Tricuspid repair: residual moderate leakage	2	16.6%
	: residual severe leakage	1	8.3%
	Aortic repair: residual moderate leakage	2	100%
Left ventricular function	Preserved	48	88.8%
	Moderate dysfunction	5	9.25%
	Severe dysfunction	1	1.85%
Right ventricular function	Preserved	51	94.4%
	Dysfunction	3	5.6%
	PHT	7	12.9%
Non operated valves	Tricuspid: moderate regurgitation	14	33.3%
	: severe regurgitation	1	2.38%
	Aortic: moderate regurgitation	8	23.5%
	: severe regurgitation	1	2.9%
Complications	Death	3	5.5%

## IV. DISCUSSION

The current study aimed to show major challenge of managing of rheumatic valve disease while the data show its existence in Burundi and good results of surgical treatment for those who get the opportunity to be operated abroad. In Burundi, the major challenge is that there are no data on rheumatic heart disease and no cardiac surgeon's team. In sub-Saharan Africa, the epidemiology and demographics of acute rheumatic fever and rheumatic heart disease remain major challenges [4-6]. The World Health organization has recognized the carelessness of rheumatic heart disease in national health policies and budgets in Low and Middle Income Countries [7]. The current approaches to acute rheumatic fever and rheumatic heart disease include early identification and treatment of Group A  $\beta$ -hemolytic Streptococcus, screening and surveillance of rheumatic heart disease, and aggressive medical, interventional, and surgical treatment strategies [8].

### Concerns' areas in Burundi

#### Political Issue

Leadership and devoted shareholder participation are crucial to success the establishment of cardiac center. It is imperative that Burundi government achieves cooperation with donor stakeholders to achieve this program.

#### Human resources training

For cardiac surgery, workforce is 0.12 adult cardiac surgeons in sub-Saharan Africa [9, 10]. Education and training of the local cardiac surgeons and cardiac surgery teams are a major part of development of cardiac surgery program in BURUNDI.

#### Financial resources

Falase *et al.* [11] estimated that mitral valve replacement with a bioprosthetic valve costs \$11,200 in Nigeria. Burundian must be supported by the government, insurance and other donors to face on the high cost of cardiac surgery.

#### Health infrastructures and equipments

For newly developing programs, various health system and infrastructure requirements are critical to ensure sustainability and safe and quality care [12]. As Burundi is in Low and Middle Income Countries, it may consider the use of used equipment or lower-cost items from upper-middle-income countries with growing cardiac surgical industry.

#### Setting up a database

Prevention, education, recognition, screening, diagnosis, treatment, and following-up care is crucial to manage RHD. For more management of rheumatic heart disease in Burundi, creating a database and/or registry is essential to trace and document both outcomes and transparency.

### Nongovernmental organizations

The role of foreign Nongovernmental organizations in Low and Middle Income Countries has been significant and well-reported [13, 14]. Burundi must set up Cardiac Foundation for a cardiac surgery program that stresses prevention of RHD and sustainability of local services as it was done in Maputo, Mozambique [15].

### Surgery outcomes

In our study, median age=24.72±11.80 years and 33 (61.1%) of them were female. The youngest and oldest patients were 9 and 60 years old, respectively. All our patients (100%) received mechanical prosthesis valve. Our results corroborate with literature data. Indeed, in Low and Middle Income Countries, patients requiring surgery for rheumatic heart disease are, on average, 20–25 years old, whereas half require surgery before the age of 20 years [16]. More than 60% of operated rheumatic heart disease cases in Africa currently receive a mechanical prosthesis valve and require long-term anticoagulation management and follow-up [17]. Moreover, the use of bio prosthetic valve is contraindicated in young patients because of early valve failure [19]. The major complications related to the mechanical prosthetic device include valve thrombosis, thromboembolism, and bleeding which are primarily anticoagulation-related problems [9]. In our study, during the follow up no valve thrombosis and no bleeding as complications. Echocardiography showed proper functioning of mitral and aortic prosthesis in 100% patients. Left ventricular function was preserved in 88.9% and 11.1% of patients had left ventricular dysfunction including one with severe dysfunction and right ventricular function was preserved in 52 (96.3%) patients. Abid *et al.* [18] found that a myocardial failure after valve replacement was not a major problem in their patients, observed in only six of 126 survivors (4.8%) after prosthetic valve replacement. Of the total 54 patients, 3(5.5%) patients died after stopping anticoagulation treatment. Kabbani *et al.* [19] reported excellent midterm results in 80 patients found similar results with a mortality rate at 6% but the study focused on only mitral valve replacement.

## V. CONCLUSION

Surgical management for rheumatic disease heart remains a major challenge in Burundi. Six areas of concerns must be considered. The medium term following up of patients who underwent rheumatic valve surgery in Sudan showed good results with 5.5% as mortality rate. An epidemiological study on rheumatic heart disease is necessary for more knowledge on this pathology in Burundi.

### Competing interests

The authors declare no competing interests.

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