ORIGINAL ARTICLE

Rheumatic heart disease in North Darfur: an alarmingly high burden and control initiative

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ABSTRACT

Rheumatic heart disease (RHD) is the most common cause of cardiac morbidity in Sudanese young people and it is particularly prevalent in Darfur area. A retrospective review of clinical and echocardiography (echo) data for children with RHD seen in Al Fashir Hospital from 2010 to 2016 was conducted. Data from the hospital statistics, outpatient and echo clinic records were collected and analysed. A control program was started based on training modules and public awareness material.

In the study period, 324 patients were admitted and 3,777 patients with RHD were seen in outpatient clinics. Complications occurred in 33% of inpatients with a case fatality of 12%. Echo revealed that 83% of patients have severe disease and 50% have a combination of more than two valves affected. Training of 50 medical assistants, 30 physicians and 10 health promoters was achieved. Public awareness programs were conducted. We found a significant burden of RHD in Al Fashir Hospital. A control program was initiated that needs substantial support from governmental and nongovernmental organizations.

KEYWORDS:

Rheumatic heart disease; Darfur; Sudan.

INTRODUCTION

Rheumatic heart disease (RHD) is a sequela of group A streptococcal infection that leads to acute rheumatic fever (ARF) and permanent damage to the heart valves. It has been largely eliminated from high-income countries due to increased use of antibiotics coupled with improved living conditions and primary healthcare systems. In Sudan, RHD constitutes one of the major causes of heart disease in children and young adults [1]. Recently, echocardiographic (echo) screening has shown that the prevalence is high in certain areas in Sudan as in North Kordofan (62/1,000) [2]. In Sudanese children, RHD presents to referral centres with severe valve lesions in 83% of cases where the only effective treatment is valve surgery which is often not available [3].

In 2012, an RHD control program based on primary and secondary prevention was established through a voluntary committee in collaboration with the Ministry of Health. The program initiated a hospital based registry that revealed that the disease is

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prevalent in Kordofan, Darfur, White Nile and Gazira areas [4].

The current paper reviews the situation of children with RHD in Al Fashir Hospital, North Darfur in Western Sudan and describes a control program initiative.

MATERIALS AND METHODS

This is a retrospective review of all children with RHD diagnosed at the Pediatric Department of Al Fashir Hospital from 2010 to 2016. The diagnosis was based on clinical and echo examination.

Echo assessment was performed using Siemens machine. Valve severity assessment was based on the modified criteria of the American Society of Echocardiography [5]. Mild mitral regurgitation (MR) was defined by a jet width of 5 mm or less and a jet to left atrium ratio of 20% or less, and severe MR as a jet width of 7 mm or more and jet to left atrium ratio of 40% or more. Aortic regurgitation (AR) was mild if the jet is 3 mm or less and the jet to left ventricle outflow tract diameter ratio of 25% or less. Severe AR is defined as a jet width of 6 mm or more and the ratio of the jet to left ventricle outflow tract of 60% or more. Moderate lesions are defined by figures between mild and severe. For mitral stenosis (MS), the valve appearance and a Doppler mean gradient of more than 7 mmHg indicated severe MS.

Hospital statistics data, inpatient and outpatient records, death reports as well as echo clinic records were reviewed. A control initiative was established through collaboration with the National RHD Control Committee members who visited Al Fashir in August 2017. Funded by the World Health Organization, a training program for physicians and medical assistants was started. Then a focal person for RHD (Dr. Nagwa Salih) carried out training of trainers (health promoters and public health officers) and conducted public awareness campaigns in Al Fashir city and Zamzam Camp for internally displaced people. Media programs were initiated through the local radio station. Permission was taken from the hospital administration to review the hospital statistics and medical records.

RESULTS

The total number of patients with RHD registered by the hospital statistics was 324 inpatients (Pediatric Department) and 3,777 outpatients. The age ranged between 6 and 18 years, the most common age group was 6–12 years and males were 56%. Complications occurred in 108 inpatients (33%) as shown in Table 1. The case fatality rate was 12%.

Echo data was available for 446 patients, the severity of the valve lesion was specified in 237; of these, 197 patients (83%) had severe, 27 (11%) had moderate and 13 (6%) had mild RHD as shown in Figure 1.

The most common isolated valve lesion was MR in 17% of patients, and 50% of patients had more than two valves affected as shown in Table 2 and Figure 2.

Table 1 - Complications seen in patients admitted with RHD.

Complication	Number	%
Death	40	12
Pulmonary hypertension	51	16
Severe heart failure	15	5
Infective endocarditis	8	2
Combination of the above	6	1.8

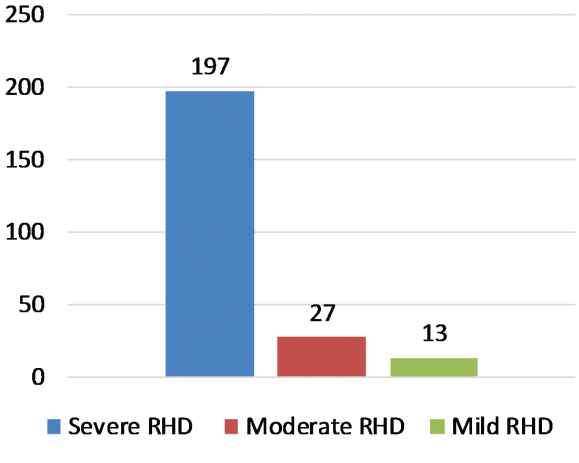

Figure 1 - The echocardiographic severity of valve lesions in 237 patients.

Training of 50 medical assistants and 30 physicians was conducted using a training module on primary and secondary prevention and a practical session on the administration of benzathine penicillin. An orientation session was held addressing medical and nursing students with 300 attendants. The RHD Control Module was introduced to the Nursing School curriculum. Ten health promoters were trained and a public awareness campaign was conducted at Zamzam camp for internally displaced people where 500 persons were addressed using songs, posters and pamphlets.

DISCUSSION

RHD presents an important health problem in children seen at Al Fashir Hospital resulting in significant morbidity and mortality. The average number of outpatients seen annually was over 600, which indicates that the disease is common in this area. A high frequency of complications was found including pulmonary hypertension and severe heart failure. Echo evidence of severe disease in more than 80% as well as the affection of more than two valves in 50% of patients indicates the presence of an advanced stage of RHD. This pattern is comparable but more aggressive than that reported previously from Khartoum [3].

Table 2 - Echocardiographic patterns and numbers of valve affection in 291 patients

Lesion	Number	%
Isolated MR	51	17
Isolated MS	21	7
Isolated AR	7	2
Combined MR/MS	31	10.6
Combined MR/AR	34	11.6
More than three valves affected	147	50.5
Pulmonary regurgitation	3	1

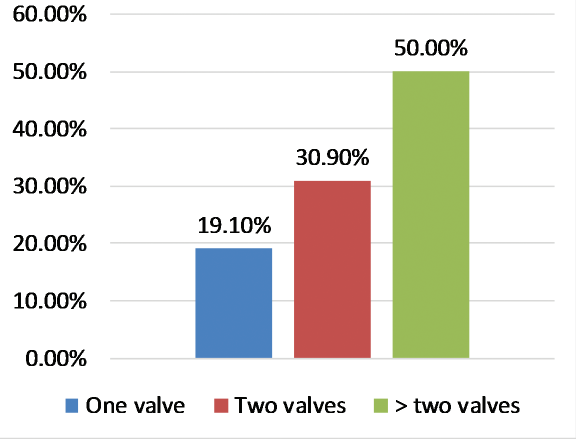

Figure 2 - The number of valves affected by RHD.

The case fatality of 12% is comparable to the REMEDY study which looked at the clinical outcomes in 3,343 children and adults with RHD from 14 countries, mostly from Africa. REMEDY revealed a fatality rate of 16.9% over 2 years indicating a poor prognosis and deficiency of surgical treatment [6].

In a sharp contrast, high-income countries where early diagnosis and surgical treatment are available such as Australia reported that only 16% of their RHD patients had severe disease. However, the case fatality for the latter group was 10%, comparable with our patients. It was found that the presence of severe disease indicated the need for surgical intervention in up to 50% by 2 years. In the same study, it was shown that 10% of patients with severe RHD were dead within 6 years [7]. This data emphasises that surgery is the only treatment that prevents death in patients with severe RHD.

In Sudan, surgical treatment was offered to only 7% patients of our cohort that was reviewed in 2014 [3] indicating a dismal prognosis of these patients. Moreover, even in patients who manage to have surgery, the outcome is still not optimal because of the prosthetic valve and anticoagulation-related complications. In a recent study from South Korea, where the health system and living conditions are remarkably better than Sudan, out of 1,731 patients who had mitral valve surgery, 16% died and 14% experienced valve-related complications 10 years after surgery [8]. In Sudan, surgical outcomes are expected to be even worse due to multiple factors including poor compliance with both anticoagulation and penicillin prophylaxis, disease progression/recurrence and the social

and financial limitations for patients living in rural areas to access medical care.

Similar factors may contribute to the high burden and aggressive disease patterns of RHD in Al Fashir. In addition, genetic susceptibility, which is a known factor that determines RHD, may have a role in the pattern of the disease in this area [9]. However, the most crucial factor that contributed to this catastrophic pattern is the lack of a Ministry of Health-based organised control program together with the weakness of the primary healthcare system. Therefore, it is mandatory to extend the National RHD Control Program and implement it in Darfur and other target areas.

The RHD Control Initiative focuses on primary and secondary prevention by training of healthcare providers on early diagnosis and management of bacterial pharyngitis and ARF. Public awareness is highly needed especially for populations living in remote areas. This initiative needs substantial support by the Ministry of Health and other partners who work in the area in order to extend it to all regions and guarantee its sustainability. Echo screening using handheld machines can be used to study the true prevalence of RHD in the community and to better diagnose RHD in its early treatable phase.

LIMITATIONS OF THE STUDY

Information on medical records was noted to be incomplete, which led to limitations of the data interpretation and accuracy. In addition, echocardiographic assessment of valve dysfunction was not available for 191 patients, which limits the interpretation of echo findings.

CONCLUSION AND RECOMMENDATION

This study revealed that RHD is causing significant mortality and morbidity at Al Fashir Hospital, North Darfur, Sudan. A control program was initiated but needs the support of the governmental and nongovernmental organisations. Echo screening is an important tool for surveillance and treatment of the early stages of RHD.

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