

## Rheumatic valvulopathies occurrence, pattern and follow-up in rural area: the experience of the Shisong hospital, Cameroon.

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**Résumé :** L'occurrence des valvulopathies post-rhumatismales, type et suivi dans une zone rurale : l'expérience de l'hôpital de Shisong, Cameroun.

La maladie rhumatismale du cœur (MRC) demeure un problème majeur de santé publique dans les pays en voie de développement. Alors que l'Afrique contient 10 % de la population mondiale, la moitié des 2,4 millions de personnes affectées par la MRC vivent sur le continent africain. Nous reportons les résultats d'un dépistage des enfants avec souffle cardiaque, utilisant l'examen échocardiographique.

Dans le cadre de cette étude rétrospective, les enfants de 5 à 18 ans avec souffle précordial ont été recrutés au centre cardiaque de Shisong, pendant une période de 24 mois (août 2005 à août 2007).

Un total de 262 enfants ont été recrutés pendant ces 2 années. Des examens électrocardiographiques (électrocardiogramme de repos) et échocardiographiques (échocardiographie transthoracique (ETT)) ont été réalisés pour chacun d'eux après l'examen clinique. Le dépistage a permis de différencier 3 catégories de patients : 64,5 % (n = 169, dont : 79 garçons et 90 filles) avaient un résultat échocardiographique anormal, en faveur de la MRC; 30,5 % (n = 80) souffraient d'une maladie congénitale du cœur et 5 % (n = 13) avaient un souffle anorganique. L'insuffisance mitrale était la pathologie valvulaire la plus fréquente, diagnostiquée chez 59,7 % des patients (n = 101); 13,7 % des patients (n = 36) avaient une maladie mitrale, 23,7 % (n = 40) avaient une maladie aortique et mitrale combinée, 25 % (n = 42) avaient une sténose mitrale isolée et 15,3 % (n = 26) une insuffisance aortique isolée. Parmi les complications de la MRC observées, l'insuffisance tricuspидienne a été constatée chez 39 patients (21,9 %), l'hypertension pulmonaire chez 20 patients (11,8 %). Les maladies congénitales du cœur notées étaient en ordre d'importance les suivantes : communication ventriculaire isolée 62,5 %, tétralogie de Fallot 29,1 %, communication interatriale isolée 3,2 %, canal artériel persistant 2,2 %, tronc artériel commun 1,9 %, canal atrioventriculaire 1,1 %.

Nos résultats montrent qu'en zone rurale, chez les enfants âgés de plus de dix ans, ayant un souffle cardiaque, la MRC devrait être suspectée en premier lieu. Et pour une prise en charge efficace des complications de la MRC, il est nécessaire de multiplier les centres de chirurgie cardiaque en Afrique subsaharienne.

### Summary:

Rheumatic heart disease (RHD) remains a major public health problem in developing countries. Whereas Africa has 10% of the world's population, broadly as many as half of the 2.4 million children affected by RHD live on the continent. We report on the occurrence and pattern of valve involvement in RHD using echocardiography in our centre and post surgical follow-up. Methods: In this retrospective study, transthoracic echocardiography (TTE) data collected from the Shisong cardiac centre over a period of 24 months (August 2005 to August 2007) were reviewed. Patients with a precordial murmur were selected.

A total of 262 echocardiographic examinations were done in the centre over the two-year study period. The screening allowed us to see two categories of patients: 169 (64.5%), 79 male and 90 female, out of the 262 patients with abnormal results had an echocardiographic diagnosis of RHD, 80 (30.5%) patients had congenital heart disease. The 13 (5%) patients left had innocent murmur. Mitral valve regurgitation was the commonest echocardiographic diagnosis present in 101 patients (59.7%). Thirty-six (13.7%) patients had mixed mitral valve disease, 40 (23.7%) had mixed aortic and mitral valve disease, 42 (25%) had pure mitral stenosis and 26 (15.3%) had pure aortic regurgitation. The Complications of RHD being observed included secondary pulmonary hypertension in 20 patients (11.8%) and functional tricuspid regurgitation was seen in 39 (21.9%).

maladie rhumatismale du cœur  
maladie congénitale du cœur  
chirurgie  
valvulopathie  
hôpital  
Shisong  
Cameroun  
Afrique intertropicale

rheumatic heart disease  
congenital heart disease  
surgery  
valvulopathy  
hospital  
Shisong  
Cameroon  
Sub-Saharan Africa

The congenital heart disease were: tetralogy of Fallot 29.1%, isolated ventricular septal defect 62.5%, isolated atrial septal defect 3.2%, atrioventricular canal 1.1%, patent ductus arteriosus 2.2%, common arterial trunk 1.9%.

Our data showed that in children above 10 years old in rural zone of Cameroon presenting with a precordial murmur, RHD has to be suspected. Acute rheumatic fever primary and secondary prevention as well as rheumatic fever registers are important for the disease eradication in our countries. More surgical centres for a better management of the RHD complications are needed in sub-Saharan Africa. Due to poverty and illiteracy of parents, the post surgical follow up of patients is challenging.

## Introduction

In economically developed countries, rheumatic fever and rheumatic heart disease have become uncommon health problems. In contrast to Third World areas such as India, the Middle East, sub-Saharan Africa, and Latin America, rheumatic fever remains the leading cause of heart disease in children and young adults (8). Rheumatic heart disease is the most important sequela of acute rheumatic fever which is caused by group A streptococci and usually present in childhood, affecting 5 to 14-year olds although it can strike people up to the age of 30. In 20% to 30% of cases, there is no cardiac involvement, but people often contract rheumatic fever more than once, and the damage is cumulative. Although the disease was rife in Western countries until 50 years ago, improvements in sanitation and housing together with the advent of widespread use of antibiotics account for its extreme rarity nowadays. But in poor and developing nations, it remains a major cause of morbidity and premature death, imposing a substantial burden on healthcare systems with limited budgets (2, 6). We report on the occurrence and pattern of valve involvement in RHD using echocardiography in St. Elizabeth catholic general hospital, Shisong cardiac centre and post surgical follow-up.

## Material and methods

### Screening

The study was approved by the Ethics Committee of the St.-Elizabeth catholic general hospital, Shisong. The hospital is situated in a rural zone of the north-west Cameroon. Between August 2005 and August 2007, 262 children with a precordial murmur underwent a screening for rheumatic heart disease.

### Clinical examination

The patients underwent clinical examination first, then the electrocardiogram (ECG), then a comprehensive transthoracic doppler-echocardiogram (TTE) with a Acuson 4-7 MHz. RHD was defined by the presence of any definite evidence of mitral or aortic valve regurgitation seen in the two planes by the TTE, accompanied by at least two of the following three morphologic abnormalities of the regurgitating valve: restricted leaflet mobility, focal or generalised valvular thickening, and abnormal subvalvular thickening.

### Pre and post surgical follow-up

Children presenting with severe heart failure after the consultation were admitted. Children diagnosed with non symptomatic valvulopathy(ies) after the TTE were given antibiotic prophylaxis for 6 months and the patient had to come for an evaluation. A so called surgical waiting list was open for patients presenting with indications for surgical correction of the valvulopathies. On the list were mentioned the name, address, phone numbers and diagnosis of the patients. The surgeries were performed in the *Policlinico San Donato* in Milan, sponsored by the *Associazione bambini cardiopatici*

*nel mondo* and *Cuore Fratello*, two non-governmental non-profit organisations.

The post surgical follow up was initiated once the patient back after correction of the valvulopathy.

### Data analysis

This is a descriptive study, data are expressed as average  $\pm$  SD. The results were analysed using the SPSS 11 statistical analysis software; for statistical difference the Student t test and  $p < 0.05$  was considered significant.

## Results

### The screening

The screening showed that patient's age ranged from 5 to 18 (average 10.03  $\pm$  9.7) years old. A total of 262 (149 female, 113 male) echocardiographic examinations were done in the centre over the two-year study period. The screening allowed us to see three categories of patients (Figure1): 169 out of the 262 patients (64.5%) with an echocardiographic diagnosis of RHD, 80 (30.5%) patients with congenital heart disease, 13 (5%) patients left with innocent murmur.

### Electrocardiogram

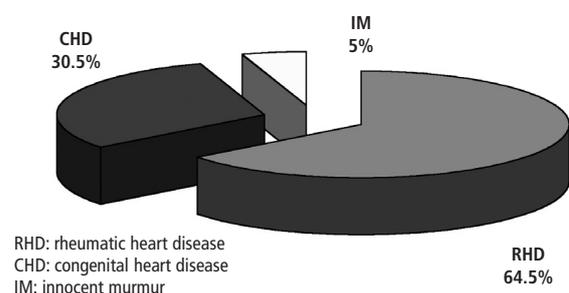
In all patients, left ventricular hypertrophy (67.3%) was the most frequently noticed. So were right ventricular hypertrophy (42.3%), left auricular hypertrophy (40.7%), right auricular hypertrophy (35.2%), left bundle branch block (27.7%), right bundle branch block (29.1%). Arrhythmias were represented with: sinus tachycardia (58.3%), atrial fibrillation (15.2%), ventricular premature contractions (39.4%), atrial premature contractions (19%).

### Transthoracic doppler-echocardiogram

In RHD patients, we could see during the echographic examination the fibrotic destruction of the mitral valve, the aortic valve at different stages, from mild to severe. We could also see a combined lesion of both aortic and mitral valves. Tricuspid regurgitation with pulmonary hypertension as a complication of the mitral valve valvulopathy was not rare. In this particular group of patients, the valves were calcificated, immobile

Figure 1.

Distribution of patients by the aetiology of the precordial murmur.  
*Répartition des malades selon l'étiologie du souffle précordial.*



in case of stenosis, rigid with coaptation defect in case of regurgitation. Mitral valve regurgitation was the commonest echocardiographic diagnosis present in 101 patients (59.7%). 36 patients (13.7%) had mixed mitral valve disease, 40 (23.7%) had mixed aortic and mitral valve disease, 42 (25%) had pure mitral stenosis and 26 (15.3%) had pure aortic regurgitation. The RHD complications observed, included secondary pulmonary hypertension in 20 patients (11.8%), and functional tricuspid regurgitation was seen in 39 (21.9%). The congenital heart diseases were: tetralogy of Fallot (29.1%), isolated ventricular septal defect (62.5%), isolated atrial septal defect (3.2%), atrioventricular canal (1.1%), patent ductus arteriosus (2.2%), common arterial trunk (1.9%).

### Pre and post surgical follow-up

Antibiotic prophylaxis was prescribed to all the children with RHD. Four per cent disappeared and didn't come anymore for evaluation and refill because of poverty. Five per cent died while still on the waiting list. Mitral mechanical prosthesis were put in 6 patients and aortic mechanical prosthesis in 4 patients, 2 girls benefited from mitral valve plasty, one girl benefited from Donald Ross surgery. The rest of children is still waiting for surgery. Once back after surgery, the ECG, the TTE were performed as well as the INR for those on oral anticoagulants. They were sent back home as soon as the parameters got stable with recommendations and medications. During the follow-up one girl with the mechanical prosthesis died suddenly. All the patients with CHD had surgery done and are all alive.

### Discussion

This study tried to determine the prevalence of RHD in children admitted at the cardiac centre ambulatory of St. Elizabeth catholic general hospital for investigation of a heart murmur. In the study, 64.5% of children presenting with a heart murmur had echographic evidences suggestive of RHD. In Cambodia the echocardiographic screening in children showed a RHD prevalence of 21,5 cases per 1000; in Mozambique the RHD prevalence was 2.3 per 1000 (2). The worst results obtained in our study can be explained first by the fact that echocardiography was performed in cases already chosen with cardiac murmur suggesting a cardiac organic pathology, secondly the high amount of overcrowded indigenous poor population in the zone. This study confirms the fact that RHD still accounts for a major proportion of all cardiovascular diseases in children and young adults in African countries. Although many cases of rheumatic valvular abnormalities in children may resolve spontaneously, many will develop to clinically manifested disease in young adulthood. CARAPETIS J (3) said cases in 5 to 14 year-old children are likely to represent only 15 to 20% of all cases in the population and represent the tip of the iceberg. The data we got are almost similar because in the study, in 8-10 year old children representing 14-18% of all cases, the valves were already thick, non functionally competent, damaged. They were already having mild valvulopathies (9). The crucial time in our study in children, is 15-18 years old when surgery is needed for the correction of the valvulopathy (10). Sometimes acute rheumatic fever is underdiagnosed because of parents and medical staff illiteracy as far as fever and joint pains are concerned, malaria will be the diagnosis not taking into consideration other manifestations of acute rheumatic fever (chorea, subcutaneous nodules, erythema marginatum and carditis). Usually patients are already presenting with heart failure, severe valvulopathy and arrhythmia. Severe MVR is usually associated with prolapse of the anterior leaflet of the

valve or with the coaptation defect of one of the leaflets (11). The ECG will be showing a sinus tachycardia with premature ventricular contractions, or premature atrial contractions, bi-auricular hypertrophy, left ventricular hypertrophy and the TTE - dilatation of the four heart cavities with very damaged and destructed valves with very poor left ventricular systolic function. How has rheumatic fever become rare in wealthy countries? Medical science can take some of the credit, thanks mainly to the use of penicillin for primary prevention, but most of the reduction is attributable to improved living conditions which have resulted in less overcrowding and better hygiene, with consequent reductions in the transmission of group A streptococci (4). It is very important to know that the mainstays of the control of rheumatic fever remain the treatment of group A streptococcal pharyngitis with penicillin (primary prophylaxis) and administration of benzathine penicillin G injections every 3 to 4 weeks for many years in people with rheumatic fever history to prevent from recurrent episodes (secondary prophylaxis). Secondary prophylaxis will reduce the number of people developing rheumatic heart disease or requiring intervention for worsening valvular damage, but it will not stop initial episodes of acute rheumatic fever (7, 12). Congenital heart disease as well as RDH are represented in the children population in this rural area of Cameroon. The most encountered pathology was isolated VSD. In absence of cardiac centre for surgery in Cameroon and poverty, pre surgical and post surgical follow-up of the children is very challenging. We cannot forget the social aspect of the problem: these patients will grow up and will not be able to help themselves, neither brothers nor sisters, a quite difficult situation for their families. If in Europe, cardiac surgery is evident and accessible to all citizens, in Africa it is still a dream, something out of reach. It is very important to mention that in this part of Cameroon, we are happy with the partnership of the St. Elizabeth catholic general hospital and the Policlinico San Donato in Milan, Associazione bambini cardiopatici nel mondo and Cuore Fratello in all aspects, for surgical correction of the valvulopathies, complications of RHD. Valve replacement in children entails a high risk. The younger the child, the higher the risk, with mitral valve replacement being the most dangerous procedure of all. Mitral valve replacement might be necessary in children with extremely dysplastic valves and severe hemodynamic impairment or after failed repair. Valve replacement in children is a procedure that should not be taken lightly and for which, at present, mechanical valves offer the best prognosis despite the small risk of anticoagulation (1, 5). We have to point out a serious moment, the necessity to explain to the children's parents the importance to come for regular evaluations after the implantation of the mechanical valve (especially when a failure of procedure designed to repair the valves occurs). For them, the child is already well and doesn't need anymore medication which is really understandable for a poor parent who has spent a lot of money for medications before surgery and still has to do although the child "is doing well". In the case when the children have to come back after surgery with a mechanical valve, after stabilisation of the INR, and in order to reduce the cost of transport for the family, the review for the control is done within 2,5 to 3 months. In Cameroon, particularly in the North West part, laboratory analyses are sometimes not reliable and medications sold around have sometimes a questionable quality. Patients are obliged to travel far away to be sure to get the best possible treatment. During the 2 years of follow up, we had a case of sudden death, probably due to valve thrombosis due to the lack of money to buy medications.

## Conclusion

Our data showed that in children above 10 years old in a rural zone of Cameroon presenting with a precordial murmur, RHD has to be suspected. Acute rheumatic fever primary and secondary prevention and also rheumatic fever registers are important for the disease eradication in our countries. More surgical centres for a better management of the complications of RHD are needed in sub-Saharan Africa. Due to poverty and illiteracy of parents, the post surgical follow up of patients is challenging.

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