The Rejuvenation of Diagnostic Cardiac Catheterization for congenital heart diseases in Nigeria: Profiles, Challenges and Prospects.

Le Rajeunissement de Cathétérisme Cardiaque Pédiatrique au Nigeria

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RESUME

Contexte / Objectifs :La Maladie Cardiaque Structurelle contribue de manière significative à la charge de la santé des enfants au Nigeria. Le cathétérisme cardiaque, une composante essentielle de l'évaluation complète du système cardio-vasculaire, n'avait pas été disponible localement pour environ trois décennies, mais a refait surface il y a environ 3 ans. Cela peut avoir contribué à la gestion non concluante des patients au niveau local et à l'exode de ceux-ci vers les pays d'outre-mer en quête de guérison. Cette étude visait à documenter les profils des patients qui avaient subi un cathétérisme cardiaque depuis sa disponibilité, les difficultés rencontrées et les perspectives liées à la procédure en étude.

Méthodes : Les patients référés pour un cathétérisme cardiaque, entre mai 2010 et septembre 2012, ont été étudiés de façon consécutive. Le profil du patient, y compris le diagnostic de départ et l'indication du cathétérisme cardiaque ont été documentés.

Résultats : Vingt-quatre patients ont été recrutés dans l'étude, tous ont été orientés vers le centre, 21 (87,5%) de l'hôpital public et 3 (12,5%) dans un centre privé. L'âge variait entre un et 62 ans, avec un âge moyen de 14,5 \pm 9,0 années. Le sexe féminin était représenté par 66,7% des patients alors que 33,3% étaient de sexe masculin avec un sex ratio H / F de 1: 2. Quinze (62,5%) avaient une cardiopathie congénitale non cyanogène et 9 (37,5%) avaient une cardiopathie cyanogène. Douze ont eu un cathétérisme cardiaque diagnostic alors que onze ont eu une fermeture d'un orifice cardiaque congénital non cyanogène par un dispositif.

Conclusions: Le cathétérisme cardiaque diagnostic et interventionnel est maintenant disponible au Nigeria. Le niveau élevé de la formation de la maind'œuvre, le coût et la disponibilité locale des consommables sont le facteur limitant majeur à son utilisation. La collaboration régionale et internationale pourrait être mutuellement bénéfique. La Maladie Cardiaque Structurelle, Cathétérisme cardiaque, cardiopathie congénitale

SUMMARY

Background/Objectives: Structural heart disease (SHD) contributes significantly to the health burden of children in Nigeria. Cardiac catheterization, an essential component of full cardiovascular system evaluation, had not been available locally for about three decades but resurfaced about 3 years ago. This may have contributed to inconclusive management of patients locally and exodus to overseas countries by patients in search of cure. This study aimed at documenting the profiles of the patients who had undergone cardiac catheterization since its availability, the challenges encountered and the prospects associated with the procedure at the study.

Methods: Patients referred for cardiac catheterization between May 2010 and Sept 2012, were studied consecutively. Profile of the patient including diagnosis at referral and indication for cardiac catheterization were documented.

Results: Twenty-four patients were recruited into the study, all were referred to the center, 21 (87.5%) from public hospital and 3 (12.5%) from private hospital. The age ranged between one to 62 years with a mean age + SD of 14.5+ 9.0 years. 66.7% were females while 33.3% were males with M/F of 1: 2. Fifteen (62.5%) had acyanotic congenital heart disease (ACHD) while 9 (37.5%) had cyanotic congenital heart disease (CCHD). Twelve had diagnostic cardiac catheterization while eleven had device closure of acyanotic congenital heart defect.

Conclusions: Diagnostic and interventional cardiac catheterization is now available in Nigeria, high degree of manpower training, cost and local availability of consumables are major limiting factor to its use. Regional and International collaboration could be mutually beneficial.

KEY WORDS

Structural heart disease, Cardiac catheterization, congenital heart disease,

INTRODUCTION

Cardiac catheterization has a long and illustrious history, beginning in 1929 when Werner Forssmann, a surgical resident and future urologist, performed the first cardiac catheterization from an arm vein on himself¹. In the 1950s, the catheterization laboratory (Cath lab) was used to understand the physiology of congenital heart defects. By the 1960s to 1970s, advances in cardiac surgery required more detailed anatomic information, which was addressed using axial angiography ^{2,3}. In Nigeria, diagnostic cardiac catheterizations were carried out in some centers in the 1970s and early 1980s. In the 1980s, two-dimensional (2-D) echocardiography made it possible for some patients to be diagnosed and treated without cardiac catheterization. In the 1990s, transoesophageal echocardiography and magnetic resonance imaging produced various cardiac images, decreasing the need for diagnostic cardiac catheterization. However, as more complex cardiac repairs are undertaken, more detailed physiologic data are necessary for the evaluation and treatment of children with congenital or acquired heart defects.⁴

A thorough cardiac catheterization provides complete physiologic and anatomic data. With the appropriate team, the risk of cardiac catheterization is low usually less than the risk associated with clinical decisions based on inadequate information.

Structural heart disease contributes significantly to the health burden of children in Nigeria. ⁵ Cardiac catheterization, an essential component of full cardiovascular system evaluation, had not been available locally for about three decades. This may have contributed to inconclusive management of patients locally and exodus to overseas countries by patients in search of cure. Hence with the re-emergence of diagnostic cardiac catheterization in the country we aimed to highlight the profiles of the patients who have undergone cardiac catheterization for congenital heart diseases since the availability of the facility, the challenges encountered and the prospects associated with the procedure

METHODOLOGIE

This was a prospective and cross sectional study carried out at the Reddington Multi-specialist Hospital, Lagos, Nigeria between May 2010 and September 2012. The subjects included 24 consecutive patients who presented at the study centre for cardiac catheterization in preparation for definitive interventions. They all had congenital heart disease which was confirmed with a baseline Transthoracic echocardiographic studies which were performed on each using a Hewlett-Packard SONOS 5500 machine and transducer with a frequency of 5MHz and were aged 1 to 62 years.

Ethical clearance for the study was obtained from the Ethical Committee of the Reddington Multispecialist Hospital, Lagos and Informed consent was sought from parents or caregivers of subjects and subjects as appropriate before enrolment into the study.

Social class was assessed using the methods described for Nigerian families based on educational attainment and occupation of parents⁶.

Data was analyzed using Microsoft Excel program. Mean, standard deviation and other parameters were generated as necessary for continuous data. Statistical significance was set at p-value < 0.05

RESULTATS

A total of 24 patient were recruited into the study, all were referred to the centre, 21 (87.5%) from public hospital and 3 (12.5%) from private hospital.

The age range between 1 year to 62 years with a mean age \pm SD of 14.5 \pm 9.0 years. 66.7% were females while 33.3% were males with M/F of 1: 2. Fifteen (62.5%) had acyanotic congenital heart disease (ACHD) while 9 (37.5%) had acyanotic congenital heart disease (ACHD).

The profiles of the patient is shown in table I and II; Fifteen (62.5%) had acyanotic congenital heart disease while 9 (37.5%) had cyanotic congenital heart disease. They comprise Nine (37.5%) patients with patent ductus arteriosus (PDA), 5 patients with Tetralogy of Fallot (21%), Large secundum ASD with severe PAH in three (12%), Partial Atrioventricular septal defect with severe PAH in two (8%) single ventricle pathology in three patients(12%), Truncus arteriosus with severe PAH and large inlet VSD with PDA each in one patient respectively.. All but one patient were in the low socioeconomic class (social class 4 and 5). Payment for the procedure was sponsored in all the patients as shown in table III. Seventy one percent by the government and 25% by charity and non-governmental organizations.

DISCUSSION

The present study aimed to highlight the profiles of the patients who have undergone diagnostic cardiac catheterization for congenital heart diseases since the re-emergence of the availability of the facility, the challenges encountered and the prospects associated with the procedure. Our study showed that the mean age of the subjects was 14.9+ 16.24 years. This mean age is very high, considering that most of the subject here had congenital heart diseases which should have been diagnosed either before birth or shortly after birth, the high mean age may be due to late diagnosis, which may also be due to late presentation and hence late diagnosis of the condition. It may also be due to the low socioeconomic status of the patients as found in this study in which all but one of the patients belong to the low socioeconomic class and hence unable to afford the cost of care even in those in which diagnosis were made earlier. A higher proportion of patients studied had acyanotic congenital heart disease; this is in conformity with documented incidences of acyanotic compared with cyanotic congenital heart disease in earlier Nigerian studies by Antia⁷, Ibadin et al ⁸ and Bode-Thomas et al⁹. A higher proportion of patients studied were females M/F of (1:2), this may be explained by the fact that most of these patients had patent ductus arteriosus and atrial septal defect which have been documented to be commoner in females. 7-9. It is also noteworthy that most males in this study had cyanotic congenital heart disease which is also in consonance with earlier documented Nigerian report. 7-9

Our study demonstrated that a total of twenty-four patients had cardiac catheterization for congenital heart disease during the study period (May 2010-Sept 2012), this is an average of about two per month. This turn out is low compared with the number of patients diagnosed with congenital heart disease who needs intervention, For example, over a period of two years, in the institution of one of the authors (BAA) about 250 new patients were diagnosed with congenital heart diseases out of which about 126 patients needed cardiac catheterization. The reasons for the low turnout recorded for diagnostic cardiac catheterization in the study centre include lack of funds by the patients to pay for the procedure. This may be corroborated by the fact the all the subjects studied were sponsored, mostly by government (71%). It may also be due to lack of awareness of the availability of the procedure in the country since it has not been available for more than three decades and many medical practitioners have had to refer patients abroad to earn the procedure and necessary intervention.. Furthermore it may also be due to lack of availability of consumables locally which restricts the performance of the procedure and definitive interventions in newborns and infants who constitute more than 60% of the

diagnosed cases mentioned above. In addition, lack of support services to handle the very complex cases of congenital heart diseases makes practitioners to still refer such cases abroad to earn diagnostic cardiac catheterization and necessary interventions in higher centers where these are available.

Another finding in this study is that all but one patient were of low socioeconomic status, although congenital heart disease is found in all socioeconomic class, a higher proportion among those in the low socioeconomic group found in this study is similar to the report of Agha et al ¹⁰ but contrary to that of Fixler et al¹¹ where median family income and household educational level did not show any significant age at referral. The finding in this study may be due to the fact that majority (87.5%) were referred from government hospital where healthcare services is highly subsidized or free.

A major challenge was the cost of the procedure which is still relatively high compared with other procedures, this may be due to the fact that none of the consumable are made locally and hence all have to be imported thereby making the overall running of the lab to be expensive and making the cost of the procedure to be high and considering that almost all the patients studied were in the low socio-economic status, and all the patients were sponsored, this will further corroborate the reason for late presentation and intervention as the patients could not afford the cost of care.

It is remarkable that the procedure were successful in all the patients and it provided more information on the disease condition which has made it possible for all the patients studied to earn their definitive surgical or transcatheter procedure locally, this has emphasized the importance of having cardiac catheterization facility available locally if definitive surgical procedure must be carried out, sustainability of the facility will aid early diagnosis, early intervention at a cheaper cost which the patient will be able to earn in their natural environment. This facility if well developed will also serve as a source of foreign reserve to the country and reduce the current exodus of patients abroad to seek for definitive cure.

One of the challenges identified in the study is the fact that there is only one functioning cardiac catheterization laboratory in the country, the need for establishment of more functioning cardiac catheterization labs in the country is obvious, in a country with a population of more than 150 million, and having the incidence of congenital heart disease as eight per thousand , and having more than 126 patients needing this procedure and definitive surgical intervention over a period of 2 years from just one of the diagnostic centers in the country, it is obvious that there are many who are yet to benefit. Establishment of more centre will not only help sort out more patients, it will also help reduce the overall cost of the procedure and make it more affordable, it will also encourage investors to establish factories where consumable can be made locally which will further help to reduce cost and conserve foreign reserves.

Another major challenges is lack of trained manpower, in the studied centre, there were very few trained personnel who often have to be over stretched during the procedure and monitoring of patients after the procedure hence the need to encourage the training of more personnel both for the current centre and for other centers to be able to thrive.

There is a to create awareness on the availability of cardiac catheterization facility in Nigeria with strengthening of referral chain and partnership, encourage local manufacturing and sale of consumables and collaboration among practioners, establishment of more functioning cardiac catheterization laboratories with training and re-training of manpower.

Table 1

Profile of patients for diagnostic catheterization and diagnosis

	AVSD- Atric	oventricular septal	defect	PAH- pulmonary artery hypertension		
Patient	Patient ID	Age in years	Sex (M/F)	Diagnosis	Social Class	Mode of sponsorship
1	RO	1.65	F	<mark>Truncus</mark> Arteriosus with severe PAH	4	Government
2	YF	2	F	Down syndrome with Large inlet VSD, moderate PDA, Severe PAH	4	Government
3	SO	5	М	Tetralogy of Fallot	5	Government
4	MF	6	F	Tetralogy of Fallot	5	Government
5	KG	8	F	Partial AVSD, cleft in left AV valve, severe PAH	5	Charity
6	AT	8	Μ	Tricuspid Atresia type 1B	5	Government
7	ET	10	М	Tricuspid Atresia type 1B	5	Charity
8	KA	15	F	Large secumdum ASD Tricuspid stenosis Hypoplastic RV Restrictive VSD	5	Government
9	IM	23	F	Tetralogy of Fallot	5	Government
10.	DM	24	F	Large secundum ASD with severe PAH	5	Government
11.	OJ	25	М	Tetralogy of Fallot	5	Government
12	RO	26	М	Tetralogy of Fallot	5	Government
13	OA	55	F	Primium ASD with moderate	5	Government

ASD- Atrial septal defect VSD- Ventricular septal defect Arteriosus RV- right Ventricle PDA- Patent Ductus

Table 2

Profile of patients for both diagnostic and interventional catheterization

Patient	Patient ID	Age in	Sex	Diagnosis	Social	Mode of
		years	(M/F)		Class	sponsorship
1	VO	3	F	Patent Ductus Arteriosus	5	NGO
2	SR	3	F	Patent ductus Arteriosus	5	Government
3	SA	3	М	Patent Ductus Arteriosus	4	Government
4	AD	4	F	Patent ductus Arteriosus	4	Government
5	BY	4	М	Patent ductus arteriosus	4	Government
6	OS	5	F	Patent ductus Arteriosus	4	Government
7	FT	6	F	Patent Ductus arteriosus	5	Charity
8	EE	10	F	Patent Ductus arteriosus	5	Government
9	DS	16	М	Patent Ductus Arteriosus	5	Charity
10	PO	34	F	Secundum Atrial septal	1	Employer
				defect		
11	AE	62	F	Secundum Atrial septal	5	Charity
				defect		

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HOMMAGE AU PROFESSEUR PIERRE NDOBO



La Société Camerounaise de Cardiologie est en deuil : elle a le regret d'annoncer, à la communauté scientifique internationale, la disparition d'un de ses illustres représentants, le Professeur Pierre NDOBO, décédé à Paris,

le 21 janvier 2013, des suites de maladie.

Pierre NDOBO était né, en 1948, à Namba, par Manjo (département du Moungo). Au terme de l'enseignement primaire, à Manjo, puis secondaire, au lycée Général Leclerc de Yaoundé, il obtient le baccalauréat D (mention assez bien), en 1969.

Il intègre le Centre Universitaire des Sciences de la Santé (CUSS) de l'Université de Yaoundé : il en sort Docteur en Médecine (mention honorable), en 1976,

Il sert comme médecin chef de l'Hôpital d'arrondissement de Makak, de 1976 à 1979. Puis, il est assistant, dans le service de cardiologie du Professeur Paul HAGBE, à l'Hôpital Central de Yaoundé

En 1981, il est admis, pour une spécialisation en cardiologie, à la Faculté de Médecine et de Pharmacie de l'Université Libre de Bruxelles (Belgique).

Au retour, en 1984, à l'Hôpital Central de Yaoundé, il sera successivement : adjoint au chef de service de cardiologie, chef de service de cardiologie, chef de l'unité de médecine interne et, à partir de 1998, chef de la clinique médicale B.

Parallèlement, il enseigne au CUSS, devenu Faculté de Médecine et des Sciences Biomédicales : d'abord assistant, puis chargé de cours, il termine maître de conférence des facultés.

Il est auteur de nombreuses publications et a formé plusieurs promotions de médecins.

Appartenant à plusieurs sociétés savantes, il était membre fondateur, aux côtés de Paul HAGBE, Kathleen NGU BLACKETT, Wali MUNA, Michel MENANGA ..., de la Société Camerounaise de Cardiologie, née en 1991. Il en a été trésorier, vice président, puis président d'honneur. Il a été représentant, pour l'Afrique Centrale, de la Société Panafricaine de Cardiologie.

Pendant de longues années, Pierre NDOBO fut membre du staff médical des Lions Indomptables, l'équipe du Cameroun de football.

Il est à noter qu'une de ses filles, marchant sur ses traces, suit actuellement une spécialisation en cardiologie, à Dakar, après un doctorat en médecine obtenu à la Faculté de Yaoundé.

Pierre, ta joie de vivre et ta bonne humeur, bien connues de tous, vont nous manquer.

Repose en paix.

Pour la Société Camerounaise de Cardiologie, Yves MONKAM-MBOUENDE Secrétaire Général