

Cardiomegaly in tropical Africa

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ABSTRACT

The term “cardiomegaly” is found in 5–7% of chest X-ray film evaluations in tropical Africa. However, “cardiomegaly” is a descriptive term, devoid of any aetiological meaning. Therefore, providing information about the aetiological factors leading to heart enlargement in a group of Africans (Nigerians) was the purpose of this study. In the years 2002–2011, 170 subjects (aged 17–80 years, mean age 42 years) in whom “cardiomegaly” was revealed by chest radiographs were studied at the Madonna University Teaching Hospital, Elele. The patients underwent echocardiography, electrocardiography, and several appropriate laboratory tests. Arterial hypertension was found to be most frequently associated with heart enlargement (39.4%), followed by dilated cardiomyopathy (21.76%), endomyocardial fibrosis (14.1%), valvular defects (9.4%), cardiac enlargement in the course of sickle-cell anaemia (6.47%), and schistosomal cor pulmonale (3.52%). This study is a contribution to a better aetiological elucidation of “cardiomegaly” in the tropics and emphasizes the importance of arterial hypertension as one of its causative factors. The dire need for effective treatment of hypertensive patients becomes evident. A high prevalence of elevated blood pressure seems to reflect an impact of civilization-related factors on the African communities.

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Key words: cardiomegaly, heart enlargement, tropical cardiology

INTRODUCTION

In many tropical regions, cardiovascular diseases rank second or third among the causes of morbidity and hospitalization. Cardiovascular pathology includes, in these areas, both the diseases typical of the tropics and cosmopolitan entities [1]. Many patients live in remote areas and their illness is sometimes detected accidentally. Occasionally the diagnosis cannot be established because of the lack of accurate diagnostic equipment. In 5–7% of chest X-ray film evaluations in tropical Africa the term “cardiomegaly” is used. Overall heart size can

sometimes be normal despite the presence of cardiac pathology (e.g. in ischaemic heart disease). However, a significant cardiac enlargement implies that heart disease is present. The causative factors of the abnormality of heart size can be multiple [2–6]. Nevertheless, “cardiomegaly” is a descriptive

term, devoid of any aetiological meaning. Therefore, providing information with regard to the aetiological factors leading to heart enlargement in a group of Africans (Nigerians) was the purpose of this clinical study.

MATERIALS AND METHODS

In the years 2002–2011, 170 subjects in whom “cardiomegaly” was revealed by chest radiographs were examined at the Madonna University Teaching Hospital, Elele. The recognition of heart enlargement was based on the cardiothoracic ratio calculations (normal ratio – up to 0.40). The investigated individuals were aged 17–80 years (mean age 42 years). The sex ratio was M:F = 92:78. Echocardiographic examination was performed using initially a Siemens scanner and later a Honda HS-2100 diagnostic scanner (microconvex system). The ECG was taken with

a 3-channel AsCARD B5 Aspel electrocardiograph. Laboratory tests: complete blood count/drop of blood treated with a reducing agent, eosinophilia, erythrocyte sedimentation rate, and analysis of stools for parasites, were undertaken in most patients. The data from the patients' files were also analysed.

RESULTS

The results of the studies are shown in Table 1.

COMMENTS

Arterial hypertension is widely distributed throughout the world. The disease also constitutes one of the most important problems in Africa [1]. In a number of African countries arterial hypertension accounts for 47-64.8% of all cardiovascular consultations, and 30-40% of the total cardiovascular hospital admissions [7]. In Nigeria, with a population of 167 million inhabitants (October 2011), approximately 20-30 million are hypertensive. The latter figures reveal the magnitude of the problem. Many individuals are completely unaware of the illness, their hypertension being detected by physical examination/BP measurement or by chest radiography showing left ventricular enlargement. However, many hypertensive individuals live in remote areas with little access to medical care. In this study arterial hypertension was found in 67 subjects (39.4%), whereas 23 individuals out of this group were hypertensive diabetic patients (34.32%). It is worthy of note that diabetic cardiopathy is characterized by a compromised ventricular relaxation in early diastole, thus diabetes mellitus does not seem to affect the heart size. On the other hand, people with diabetes are prone to silent (pain free) myocardial ischaemia, and silent infarctions are more common in diabetic patients.

Such patients commonly present with cardiac enlargement and congestive heart failure from their infarctions. For the above reasons there is a high usefulness of echocardiography in assessing cardiac morphology and function both in hypertensive subjects and hypertensive diabetic patients.

Dilated cardiomyopathy is characterized by dilatation of the cardiac chambers (in particular the ventricles) with a severely hypokinetic myocardium. The onset of the disease can be preceded by a viral infection (mostly due to Group B coxsackie viruses). An acute viral myocarditis may evolve into chronic myocarditis, leading to dilated cardiomyopathy in an individual with reduced suppressor T cell function or genetic predisposition. Viral heart disease can be assumed to be the first stage of dilated cardiomyopathy. Reports from Senegal and Ivory Coast showed a frequency of 7.2-57% of dilated cardiomyopathy in cardiac patients [7]. In the present study of 170 subjects with heart enlargement the cases of dilated cardiomyopathy accounted for 21.76%.

Endomyocardial fibrosis is a form of heart disease, the typical feature of which is fibrosis in the ventricular cavities, affecting in particular the apex and subvalvular regions. In most cases the disease process is localized either to the right and left ventricles or to the right ventricle only. The fibrotic lesions compromise the diastolic function of the myocardium. With endomyocardial fibrosis there is usually a marked dilatation (sometimes aneurismal) of the right atrium on chest radiograph. J.N.P. Davies (Uganda – 1948) was the first to report on this endemic heart disease. The patient is often a child or adolescent aged about 15-17 years. In Nigeria, the initial illness usually begins in the rainy season, and relapses also tend to occur during these spells (May-October).

Table 1. The results of the studies of 170 subjects with heart enlargement

No.	Results/diagnosis	No. of subjects	(%)
1.	Left ventricular hypertrophy/arterial hypertension	67	39.4%
	(arterial hypertension concurrent with diabetes mellitus)	23/67	34.32%
2.	Dilated cardiomyopathy	37	21.76%
3.	Endomyocardial fibrosis	24	14.1%
4.	Valvular defects	16	9.4%
5.	Sickle-cell anaemia	11	6.47%
6.	Pericardial effusion	9	5.29%
7.	Schistosomal cor pulmonale	6	3.52%

Acquired valvular heart disease is mostly due to rheumatic valve damage. Rheumatic fever is an inflammatory disease that occurs as a sequela to infection with Group A streptococci (e.g. streptococcal pharyngitis, scarlet fever, streptococcal pyoderma). The most consistent predisposing epidemiological factors for streptococcal infections and rheumatic fever are crowded living conditions and inadequate treatment and prevention of streptococcal infections. Although rheumatic fever appears to be under good control in Europe and the USA its prevalence in Africa (especially in North Africa) continues to be high. Mitral valve disease is more common in rheumatic heart involvement than aortic valve defects.

Sickle cell anaemia is one of the leading health problems in many African countries including Nigeria [7, 8]. Cardiomegaly may appear in the first year of life and often gradually increases with age. A much more insidious complication occurring in later life is progressive pulmonary hypertension leading to chronic cor pulmonale. The most common underlying diseases responsible for pericardial effusion in the tropics are: tuberculosis, endomyocardial fibrosis, bacterial infective pericarditis, idiopathic pericarditis (probably viral in origin and usually seen in young people), neoplastic as well as an effusion seen in patients with amoebic liver abscess.

In schistosomiasis (bilharziasis) cardiac manifestations are usually the result of pulmonary arterial hypertension causing schistosomal cor pulmonale. The pulmonary vascular changes are caused by the ova (schistosome eggs) trapped in the small arterioles. Schistosomal cor pulmonale may be seen in the three main schistosomal infections but is commonest in *S. mansoni* and *S. japonicum*.

The Madonna University Teaching Hospital, Elele is located in the Southeastern territory of the Federal Republic of Nigeria. The territory is also known as the Ibo land where the Ibos, who are Catholics, constitute the majority of the population. The Ibo land is an agricultural area where the cassava plant (man-

ioc) and yam are grown in large quantities. Also in this area the world's largest oil companies operate. Several large cities like Port Harcourt, Aba, Onitsha, Enugu, and Calabar are scattered all over the territory. Most patients attended in the MU Teaching Hospital come from rural areas and nearby towns.

As can be noted, the high prevalence of arterial hypertension in this study is a striking fact. This finding seems to reflect the impact of civilization-related factors on African communities.

CONCLUSIONS

1. Arterial hypertension was found to be the most common condition associated with heart enlargement in this study.
2. The diseases typical of the tropics, e.g. endomyocardial fibrosis or schistosomiasis, were less frequently encountered in this "cardiomegaly" group.
3. A high prevalence of elevated blood pressure seems to reflect the impact of civilization-related factors on African communities.

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