Original Article

Cardiac Arrhythmias in Recently Diagnosed Hypertensive Patients at First Presentation an Electrocardiographic-Based Study.

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SUMMARY

Various forms of cardiac arrhythmias have been documented in hypertensive subjects, and hypertension is an important risk factor for the development of atrial and ventricular arrhythmias and sudden death[1]. Electrocardiography at rest easily documents significant arrhythmias in patients, and this study was carried out to determine the types and frequency of arrhythmias in hypertensive subjects at first presentation in the Hypertension Clinics of the University of Nigeria Teaching Hospital (UNTH) Enugu, Nigeria.

The study was hospitalbased and retrospective in nature. The resting 12lead ECG reports of 346 consecutive hypertensive subjects seen at the Hypertension clinics of the UNTH Enugu over a 14 month period were retrieved from the case files and studied. Other information obtained from the case files included the age and gender of the subjects.

The mean age of the subjects was 57.3years. Ninety-five of the subjects had arrhythmias representing 27% of the study population, out of which fifty-five were males (57.9%) and forty were females (42.1%). However 26.9% of all the male subjects had arrhythmias while 28.2% of all the females had arrhythmias. Multiple ventricular ectopics, sinus tachycardia, sinus bradycardia and atrial fibrillation were the most prevalent arrhythmias.

This study showed that a significant proportion of hypertensive subjects present initially with significant rhythm disturbances.

KEYWORDS: Arrhythmia, Hypertension, 1st Presentation, ECG.

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INTRODUCTION

Various forms of cardiac arrhythmias have been documented in hypertensive subjects, and hypertension is an important risk factor for the development of atrial and ventricular arrhythmias and sudden death.[1] The most common arrhythmias are atrial ectopics, ventricular ectopics and atrial fibrillation.[2,3,4]

Available evidence shows that hypertension is not just a marker, but that it plays a direct role in the development of these rhythm disturbances. This risk is greatest in individuals with evidence of left ventricular hypertrophy (LVH) and left atrial abnormality on ECG or echocardiography.[5,6,7]

Even when the left atrial and left ventricular chamber sizes are normal, the structural and functional alteration in the setting of chronic hypertension predispose to atrial and ventricular arrhythmias and sudden death.[6,8.]

Atrial fibrillation is the most common and most serious of the atrial tachyarrhythmias because of its association with fatal and non-fatal stroke and heart failure.[6,9,10]

Premature ventricular beats and complex ventricular tachyarrhythmias are more prevalent in hypertensive patients with left ventricular hypertrophy than those without or normotensive subjects.[11] Most studies have demonstrated that left ventricular hypertrophy and other forms of cardiac hypertrophy predict increased frequency and complexity of ventricular arrhythmias and the combination foretells subsequent sudden death.

Although the mechanisms underlying this risk are incompletely understood, the emerging consensus invokes a combination of increased oxygen consumption, increased myocardial fibrosis and collagen deposition, impaired coronary vasodilator reserve, subendocardial ischaeemia and cellular electrophysiologic abnormalities in cardiac hypertrophy.[12]

Changes in the electrical property of the atria are known to occur early in hypertensive heart disease and precede the appearance of left atrial enlargement and left ventricular hypertrophy (LVH).[13] LVH paves way for atrial fibrillation (AF) by pertubing diastolic function and thereby raising the left atrial pressure.[14]

In the Framingham cohorts, patients with an ECG diagnosis of LVH had a 3-3.8 fold increase in the risk of developing atrial fibrillation.[9]

Verdecchia et al found that in hypertensive subjects with sinus rhythm and no major predisposing conditions, the risk of atrial fibrillation increased with age and left ventricular mass, whereas increased atrial size predisposed to chronicization of AF.[15]

Ventricular arrhythmia is usually triggered by single or complex ventricular ectopics, but the mechanism whereby tachycardia is perpetuated more usually involves a reentry circuit.[17]

Arrhythmogenic factors for the development of ventricular arrhythmias include LVH, myocardial ischaemia, impaired left ventricular function.[16]

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Ventricular premature beats are more common in hypertensive subjects with concommitent LVH, but ventricular tachycardia and fibrillation are however rare.[17,18,19,]

Asymetric septal hypertrophy seems to be associated more often with ventricular arrhythmias than concentric LVH and the incidence of arrhythmias drops with reversal of the LVH.[20] Myocardial ischaemia and ventricular dysfunction are the other major arrhythmogenic factors.

As a general rule, at least 2 of the abovementioned risk factors (LVH, myocardial ischaemia or impaired ventricular function) need to be present for onset of the most dangerous forms of ventricular arrhythmias (ventricular fibrillation and ventricular tachycardia) in hypertensive subjects.[17]
Global mortality is increased in patients with LVH if there is complex or frequent ventricular ectopics even if these are asymptomatic[21,]

Hypertension is the commonest cardiovascular disease in Nigeria,[22] and the level of awareness of its existence is quite low among Nigerians.[23]

This low level of awareness makes most hypertensive patients present late to hospital, often with complications. There is a dearth of reports on the percentage of hypertensive patients who present with arrhythmias on initial assessment in our environment, and this study aimed to fill this gap.

The study was carried out at the University of Nigeria Teaching Hospital Enugu. At the time of this study, the hospital was located at the temporary site in Enugu, and was a 700-bedded hospital. The hospital is also designated the National Cardiothoracic Centre of Excellence and provided services in cardiovascular medicine and surgery for over 30 million Nigerians as well as patients from neighbouring Cameroon, Gabon and Equitoreal Guinea.

SUBJECTS AND METHODS

The study was retrospective in nature, and the subjects were drawn during the study period from electrocardiograms (ECG) of consecutive hypertensive subjects attending the cardiac clinics and medical outpatient clinics of the University of Nigeria Teaching Hospital (UNTH) Enugu, South East Nigeria.

The ECG reports of all adult subjects of both sexes who were diagnosed to have systemic hypertension and/or had not been on antihypertensive medications for more than two weeks prior to presentation were retrieved from the patients' case notes. The study period included ECGs done from August 2003 to September 2004 in all recently diagnosed hypertensive patients.
12-lead surface ECG has a high specificity and a high sensitivity for detecting sustained cardiac arrhythmias, but may fail to detect transient rhythm disturbances.

The medical outpatient clinics of the University of Nigeria Teaching Hospital attends to patients with medical problems who are aged 18 years and above and are open to patients 5 days a week. Each medical outpatient clinic has a hypertension clinic because hypertension is the commonest non-communicable disease in Nigeria. In addition, the cardiology unit runs an afternoon clinic on a weekly basis where some cases of refractory hypertension are treated. The patients were referred from the General Outpatient Department of the hospital, Surgery Departments, Obstetric and Gynaecology Department or from other hospitals in the community for proper blood pressure management.

The age, gender, height, weight, pulse and blood pressure of the subjects were extracted from the ECG register. The resting 12 lead ECG was done with a 3channel Cardiette ECG machine Auto Ruler 12/1 Model (Made in Italy). The ECGs were recorded using the manual mode of the Cardiette Autoruler machine for 30 seconds and an additional rhythm strip was recorded for 15 seconds. The ECGs were done after the subjects had rested for at least ten minutes.

The ECGs had been interpreted by 2 cardiologists working together and the results recorded in a register. The few areas of disagreement were resolved by an older cardiologist who is a co-author. Data obtained from each ECG strip included presence or absence of arrhythmia and type of arrhythmia.

Data was subsequently analyzed using the SPSS version 10 Software and presented as tables and figures and comparison for statistical significance was by student t-test. Significance was set at $p = 0.05$.

RESULTS

The study population comprised 346 hypertensive subjects made up of 204 males (58.9%) and 142 females (41.1%). The age range was from 20 82 years with a mean age of 52.9 ± 17.6 years. The mean age of males was 51.7 ± 13.4 years while the mean age of females was 54.1 ± 20.3. There was no statistically significant difference between the ages of both genders ($p=0.2$).

Ninety five of the subjects had arrhythmias representing 27% of the study group. Fifty five of these (57.9%) were males while 40 were females (42.1%) (Figure I). There was no statistically significant difference between the mean age of subjects with and without arrhythmias ($p=0.07$).

However 26.9% of all the male subjects had arrhythmias while 28.2% of all the females had arrhythmias (Figure II), but there was no statistically significant difference between the frequencies of arrhythmias in both groups ($p=0.09$).

Multiple ventricular ectopics, sinus tachycardia, sinus bradycardia and atrial fibrillation were the most

Figure I : Proportion of all Subjects with Arrhythmia and Gender Distribution

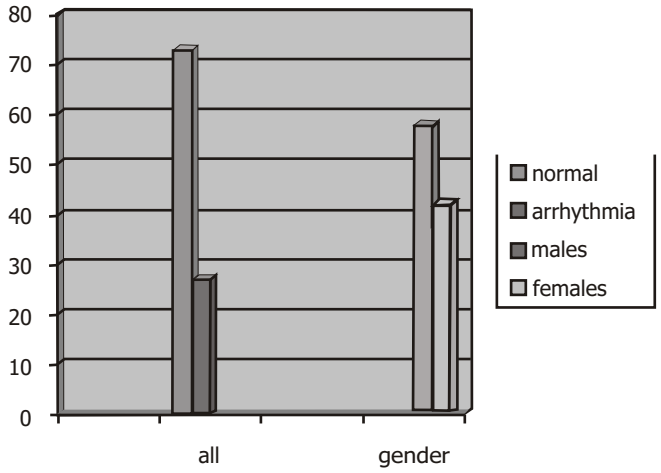

Figure ii : Percentage of each Gender with Arrhythmia

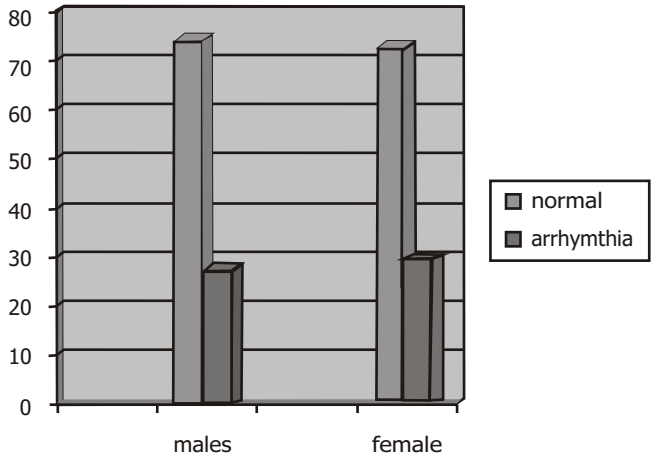

Table I: Distribution of Arrhythmias by gender

Arrhythmias	Total Number	Males	Females	Percentage
Atrial fibrillation	13	6	7	13.7
Sinus tachycardia	15	6	9	15.8
Sinus bradycardia	16	8	8	16.8
Supraventricular Tachycardia	6	5	1	6.3
Atrial flutter	2	2	0	2.1
Complete Heart Block	4	4	0	4.2
Multiple Ventricular Ectopics	20	14	6	21.1
Few Ventricular Ectopics	18	11	7	18.9
Multiple Atrial Ectopics	2	1	1	2.1
Few Atrial Ectopics	7	4	3	7.4
Wandering Pacemaker	3	3	0	3.2
Sinus arrhythmias	5	4	1	5.3
Ventricular tachycardia	1	0	1	1.1
Sinus pauses	2	1	1	2.1

prevalent arrhythmias encountered (Table I).

DISCUSSION

This study shows that arrhythmias are common in subjects with hypertension at the time of initial presentation. Several other studies done in the past, though not on recently diagnosed hypertensive subjects had also reported arrhythmias to be quite common in these subjects.[2,3,4,]

Most hypertensive patients in our environment present with complications including arrhythmias because routine medical examination is not a common practice even amongst health workers. The few subjects who had dangerous rhythm disorders (ventricular tachycardia and complete heart block) were candidates for sudden death if there had been no interventions.

Our findings confirm the assertion that hypertension is still a silent killer. It's largely asymptomatic nature makes it difficult for patients in our environment to present to hospital early, and most of these subjects may actually have been hypertensive for several years before recruitment for the study.

People in most sub-Saharan African countries find it extremely difficult to understand why they should visit a healthcare provider for medical examination in the absence of ill-health. A lot of hypertensive subjects in our environment also find it extremely difficult to see the need to be on medications for an 'illness' which usually has no symptoms. These may explain the high percentage of hypertensive subjects presenting with arrhythmias. Routine medical examination is not taken seriously and some lucky individuals are discovered when their employers mandate them to go for medical examination.

Anisiuba et al had documented hypertension to be the commonest cause of atrial fibrillation in a study of 860 patients done in Nigeria.[3,]

Opadigo et al reported that 23% of their hypertensive patients had arrhythmias.[2]

Hypertension will continue to be a silent killer especially in sub-Sahara Africa until the general

populace appreciates the need to routine medical checks even in the absence of ill heath. Also medical practitioners should perform the necessary examinations on subjects both clinical and laboratory before issuing medical certificates of fitness.
This will increase the chances of diagnosing hypertension in a greater number of individuals as well as detecting any complications present.

Also various government agencies should mount vigorous hypertension awareness campaigns among the public because of the high level of ignorance about the nature of the illness. Medicare providers should endeavour to educate their hypertensive subjects on the causes, complications and management of hypertension. The lifelong nature of management should always be emphasized so that the concept of cure for every illness which most Africans believe in could be properly repositioned.

Though hypertension is commoner in males in Nigeria, the percentage of females with significant rhythm disturbances was higher in the study population, though the difference was not statistically significant. It has also been reported in some studies that the complication of hypertension seem to be more prevalent in females than males.

Electrocardiography is simple, affordable and available and every hypertensive subject should get a baseline ECG at diagnosis and subsequently as the need arises.
Pre-employment medical examinations, and other forms of medical examinations should be taken seriously by both the subjects and the doctors because those may be the only opportunities to discover dangerous medical conditions including hypertension and arrhythmias.

CONCLUSION

Most hypertensive patients in our environment present with complications including arrhythmias because routine medical examination is not a common practice even amongst health workers.

Pre-employment medical examinations and other forms of medical examinations should be taken seriously by both the subjects and the doctors because those may be the only opportunities to discover dangerous medical conditions including hypertension and arrhythmias.

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