

Sudden Cardiac Death in Hypertensive Heart Disease Patients in Umuahia, Abia State, Nigeria: An 18 month Case Series Report

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ABSTRACT

Left ventricular hypertrophy has been documented as an independent risk factor for sudden cardiac death (SCD) in hypertensive patients. Hypertension and hypertensive heart disease (HHD) have been identified as growing public health problems in developing parts of the world especially sub-Saharan African countries like Nigeria. Cases of four black African hypertensive heart disease patients with risk factors for SCD were followed up in-hospital and out-of-hospital, three of whom had out-of-hospital SCD and one in hospital. Left ventricular hypertrophy from hypertensive heart disease predisposed these patients to SCD likely from ventricular arrhythmias.

Keywords: Sudden Cardiac Death, Hypertensive Heart Disease.

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INTRODUCTION

Hypertensive heart disease is the constellation of the pathological conditions that are usually present in hypertensive patients which include left ventricular hypertrophy, myocardial fibrosis, ischemia, intrinsic myocyte impairment, apoptosis, endothelial dysfunction and increased arterial stiffness.¹ It is a growing public health challenge since its cause, hypertension, has become a well-known growing public health challenge, worse in black African communities who not only have more prevalence, but also have more and worse outcome of the complications of hypertension.¹⁻⁹ A combination of hormonal factors like the Renin-Angiotensin-Aldosterone system (RAAS), catecholamines, endothelins, nitric oxide, interstitial and perivascular deposition of fibrillar collagen have been implicated in HHD with myocardial hypertrophy.^{10,11} Myocardial ischemia (with normal coronary arteries) from arteriolar constriction due to perivascular and interstitial fibrosis have been shown to play a role in HHD.¹² Angiotensin II, aldosterone, oxidative stress, and ischemia are all involved in the process of increased apoptosis in HHD.¹³ Ventricular hypertrophy is followed by dilatation and contractile impairment, with a reduced ventricular ejection fraction due to alteration in contractile protein, remodeling of extracellular matrix, micro vascular ischemia and fibrosis.¹⁴⁻¹⁷ All the above may lead to irregular hypertrophy pattern and inhomogeneous propagation of the electrical impulse of the heart leading to various arrhythmias.¹⁸ Arrhythmias common in HHD ranges from supraventricular to ventricular arrhythmias, even to lethal arrhythmias that lead to sudden cardiac death.¹⁹

Sudden Cardiac Death is defined as an unexpected sudden death of cardiac cause, in a person without any previous conditions appearing fatal, which occurs within a short period of one hour or less from onset of symptoms,²⁰ but definition by the American Heart Association is the cessation of cardiac mechanical activity, as confirmed by the absence of signs of circulation.²¹

The mortality from SCD in the USA is about 300,000 yearly.²² In Nigeria, though a nation-wide data is not available as at the time of this study, according to the Ile-Ife study Hypertensive heart disease was the cause of death in 83.5% cases of sudden cardiac deaths (SCD), of which only 30.3% were previously diagnosed. Ischemic heart disease and cardiomyopathies ranked next as the most common cause of death with 6.3% each. This showed that Hypertensive heart disease is the most common cause of sudden cardiac death in Nigerians, and many of hypertensive cases were previously undiagnosed. Cases of coronary heart disease and myocardial infarction played significant roles as causes of sudden cardiac death, indicating that their incidence may not be as rare among Nigerians as previously thought.²³

Risk factors for SCD include age, hypertension, intraventricular conduction block, elevated serum cholesterol, glucose intolerance, smoking and drugs- including antiarrhythmic, phosphodiesterase inhibitors and antipsychotic medications. Disease states associated with SCD include coronary artery disease, cardiomyopathies, valvular heart diseases, congenital heart diseases (like Tetralogy of Fallot, Transposition of great vessels),

primary electrophysiological abnormalities (like Long QT syndrome, Wolf-Parkinson-White syndrome, Brugada syndrome) and left ventricular hypertrophy.²⁴

Left ventricular hypertrophy, whether established by electrocardiogram (ECG) or by cardiac echocardiogram, is a strong independent risk factor for cardiovascular deaths and, in particular, sudden cardiac death in patients who also had a history of hypertension from the above mentioned mechanisms of hypertensive heart disease.²² Ventricular arrhythmias like ventricular tachycardia or ventricular fibrillation is the common mechanism of SCD in the hypertrophied ventricle.

Relevant investigations include electrocardiographic monitoring (including Holter), echocardiography, chest radiograph, lipid profile, serum electrolytes.

In-hospital pharmacological treatment includes β -blockers and Amiodarone while non-pharmacological management includes use of implantable cardioverter defibrillator for patients with ventricular tachy-arrhythmias.²⁵ Out-of-hospital management include application of basic life support by eye witnesses and calling for help for advanced life support.²⁶

CASE PRESENTATION

Four hypertensive heart disease patients who had clinical features of arrhythmias were monitored and followed up from hospital to home with the assistance of their relatives for a period of 18 months (between November 2013 to April 2015).

CASE 1

A 46-year old Black African male, known hypertensive patient for about 5 years with past history of recurrent palpitations, an electrocardiographic evidence of left ventricular hypertrophy (LVH), left atrial enlargement (LAE) and leftward axis deviation. His medication included tabs nifedipine 20mg daily, and tabs lisinopril 5mg daily, but with poor compliance. He was in apparent stable state of health till the day of incidence when he finished his regular aerobic exercise at the gym, took a shower and slumped afterwards. He was found to be dead few minutes later before he could be offered medical help.

CASE 2

A 48 year old Black African male businessman, newly diagnosed hypertensive patient, who presented with recent onset palpitations and retrosternal chest pain, with radiographic cardiomegaly and electrocardiographic evidence of LVH, LAE, and leftward axis deviation. His medication included tabs amlodipine 5mg daily, tabs lisinopril 5mg daily, tabs aspirin 75mg daily, but he was very non-compliant with his medication. He was found dead in his office by his staff after close of work.

CASE 3

A 57-year old Black African male, a known hypertensive patient for about 10 years with history of recurrent chest pain and palpitations. He has radiographic evidence of cardiomegaly and electrocardiographic evidence of LVH and LAD. His medication included tabs amlodipine 10mg daily, tabs lisinopril 5mg daily, tabs aspirin 75mg daily. He was also managed by the psychiatrist for psychotic disorder for which he was taking tabs haloperidol and risperidol with good compliance. He was noticed to have died

in his house with no one available to give account of any precipitating activity.

CASE 4

A 68 year old retired clergy of Black African origin, a known hypertensive for about 23 years, presenting with worsening shortness of breath, bilateral leg swelling, and associated orthopnea. Investigations showed radiographic cardiomegaly, and unfolded aorta, and electrocardiography revealed LAE, LVH, right atrial enlargement, and right ventricular hypertrophy. Echocardiography showed global chamber dilatation, left ventricular systolic dysfunction with ejection fraction of 24%, functional mitral and aortic regurgitation. He was managed in-patient as a case of hypertensive heart failure New York Heart Association (NYHA) 4 and his medication included intravenous furosemide, tabs spironolactone, tabs lisinopril, and tabs amlodipine. Drug compliance was good and patient's clinical state improved to NYHA 2, but just as he was being prepared for discharge, he suddenly stopped breathing and efforts to resuscitate him were not successful.

DISCUSSION

Left ventricular hypertrophy, a component of hypertensive heart disease is a known independent risk factor for SCD. The patients under study all had left ventricular hypertrophy and other features of hypertensive heart disease including ventricular dilatation and arrhythmias. Three out of four of them were middle aged. All of them were male black Africans. One of the subjects had added risk factor of use of antipsychotic medications. Only one of them had physical activity as the precipitating factor. Only one of the subjects died in the hospital. The others were out-of-hospital death.

CONCLUSION

Hypertension, which leads to hypertensive heart disease, is a growing public health problem in sub-Saharan Africa including Nigeria. Left ventricular hypertrophy, myocardial ischemia and arrhythmias which are risk factors for SCD are components of hypertensive heart disease. More detailed screening, investigations and follow-up (including out-of-hospital monitoring) in HHD patients may help detect patients at risk of SCD and prevent fatal consequences. The public should also be informed on basic life support and the need to call for assistance for out-of-hospital cases.

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