

Changing trend in the incidence of myocardial infarction among medical admissions in Ilorin, north-central Nigeria

Kolo PM*, Fasae AJ, Aigbe IF, Ogunmodede JA, Omotoso AB
Cardiology Unit, Department of Medicine, University of Ilorin Teaching Hospital,
P.M.B 1459, Ilorin Nigeria

*correspondence to:
e-mail- etsumanma@yahoo.com
Telephone: +2348035837062

Summary

Aims and objectives: This study aimed at reviewing cases of myocardial infarction managed between January 2006 and June 2009.

Materials and Methods: Records of all patients managed for acute MI during the period were studied. Diagnosis was based on presence of ischemic type of chest discomfort, serial electrocardiographic (ECG) changes compatible with MI, a rise in troponin I level and echocardiographic abnormalities.

Results: Fourteen patients consisting of 13 (92.9%) males and 1 (7.1%) female had MI. They were all Nigerians, their ages ranged from 40 to 82 years with a mean of 55.6 ± 12.7 years; and 85.7% of them belonged to social class 1. MI accounted for 0.21% of the total 6647 admissions during the period. Present hospital incidence (0.21%) is significantly higher ($\chi^2=6.8$, $p=0.01$) than previously reported incidence of 0.075%. Twelve patients had systemic hypertension, 8 had high body mass index, 6 had dyslipidaemia, 5 smoked cigarette and 2 had diabetes mellitus. Three patients died giving a case fatality rate of 21.4% and another 3 developed chronic left ventricular systolic failure.

Conclusion: Incidence of MI is increasing among hospital admissions in Ilorin and there is an urgent need for community interventions targeted at early detection and treatment of hypertension, diabetes mellitus, dyslipidaemia and obesity. Campaigns against cigarette smoking should be sustained.

Key words: myocardial infarction, increasing incidence, multiple risk factors, Nigeria.

Introduction

Coronary artery disease (CAD) is well known to be rare among Continental Africans and infectious diseases accounted for most deaths from sub-Saharan Africa¹⁻². Recently, most reports from sub-Saharan Africa have suggested that the incidence of CAD is on the increase because of increasing urbanisation, sedentary lifestyle and consumption of food rich in fats and sugar³⁻⁵. Epidemiological studies had shown that CAD was very rare in Nigeria in 1970s and this persisted until late 1990s when some workers observed a gradual rise in the number of individuals with CAD⁶⁻⁸. This has been attributed mainly to worsening of cardiovascular risk profiles among Nigerians⁹. In our centre, only ten cases of acute myocardial infarction (AMI) were seen over a ten year period (1984-1994) indicating the rarity of the condition previously¹⁰. On the other hand, more recent studies in

most parts of Nigeria had shown a gradually worsening of risk factors for CAD and cases of MI. In a review of CAD in Kano, Nigeria, 22 patients were managed over a 5 year period¹¹. In the same vein, 4 cases of acute MI were seen in Zaria, Northern Nigeria in 2003 arousing the suspicion of the disease becoming more prevalent¹². We had also observed an increase in the frequency of cases of MI among patients admitted to our medical wards since 2006. Therefore, this study was aimed at comparing the current incidence of MI at the University of Ilorin Teaching Hospital (UITH), Ilorin Nigeria with that of previous report in order to determine if the disease occurrence is on the rise or not.

Materials and Methods

The records of all patients managed for AMI at UITH, Ilorin between January 2006 and June 2009 were

reviewed. The World Health Organization (WHO) requires at least two of the three criteria for the diagnosis of AMI to be established¹³. These include; ischaemic type of chest discomfort, serial electrocardiographic changes compatible with AMI and a rise in cardiac enzymes. Diagnosis of AMI was made in our patients based on the first two criteria. Facility for cardiac enzymes was not available neither was coronary angiography done except in one patient who had the opportunity to travel abroad. This patient was found to have severe triple vessel disease with an occluded circumflex system, diffuse stenosis in the posterior descending artery and severely diseased left anterior descending (LAD) artery. He had coronary artery by-pass graft (CABG) surgery which involved saphenous vein graft to posterior descending and first diagonal arteries with left internal mammary artery graft to LAD. He was discharged but died suddenly three weeks thereafter at his home in Nigeria.

All the patients were admitted in our medical wards and only two were transferred to the Intensive Care Unit of the hospital. The following data about each patient were recorded: age, sex, body mass index (BMI), blood pressure (BP), type of MI and identifiable risk factors. Patients' occupation, socioeconomic status, patients' tribe and race were also noted. Clinical outcome of the patients were also recorded. The total number of admissions into the medical wards during the period under review was gotten from the Medical Records Department of UIITH, Ilorin.

Statistical analysis

Data obtained was entered into statistical package for social sciences (SPSS) version 15. Frequency distribution and percentages were generated and means for age, BMI, total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), triglycerides (TG) and fasting blood sugar (FBS) were generated.

Results

Fourteen patients consisting of 13 (92.9%) males and 1 (7.1%) female were admitted for AMI during the period of study. They were all Nigerians, their ages ranged from 40 to 82 years with a mean of 55.6 ± 12.7 years; and majority (85.7%) of them were in social class 1 (businessmen, politicians and senior academics). AMI accounted for 0.21% of the total 6647 admissions into the medical wards of the hospital during the period. When compared with previous report from the centre, the current incidence of 0.21% was significantly higher ($\chi^2=6.8$, $p=0.01$) than the former (0.075% of 13,349) reported incidence. Four (28.6%) patients had anterior MI, 3 (21.4%) inferior, 3 (21.4%) apical MI, 2 (14.3%) anteroseptal and 2 (14.3%) had lateral MI as assessed by ECG and echocardiogram.

Table i displays the clinical and biochemical characteristics of the patients. The mean BMI (27.5 ± 4.6 kg/m²) was above normal range but the mean total

cholesterol (4.8 ± 1.0) was within normal range. Figures 1A & 1B show serial ECG changes from one of the patients with anteroseptal MI. There was hyper-acute ST segment elevation and T-wave inversion (figure 1B) in chest leads V1-V4. Figure 2 is an echocardiogram from the same patient showing septal hypokinesia.

Table ii shows combination of risk factors identified in the study subjects. Many of the patients (57%) had a combination of at least 2 risk factors identified. Most (85.7%) of the affected individuals were hypertensive and 57% had high BMI. Six (42.9%) patients had dyslipidaemia, 5 (35.7%) smoked cigarette and only 2 (14.3%) had type 2 diabetes.

Outcome of the patients: Three patients died giving a case fatality rate of 21.4% and 11 (78.6%) individuals survived. However, 3 (21.4%) patients developed chronic left ventricular systolic failure.

Table i: The clinical and biochemical characteristics of the patients (n=14)

Variable	Minimum	Maximum	Mean (SD)
Age (years)	40	82	55.6 (12.7)
BMI (kg/m ²)	22.5	37	27.5 (4.6)
SBP (mmHg)	110	170	36.5 (18)
DBP (mmHg)	70	100	85.4 (8.5)
FBG (mmol/l)	3.2	13.6	5.3 (2.8)
TC (mmol/l)	3.7	6.8	4.8 (1.0)
TG (mmol/l)	0.7	3.8	1.5 (0.8)
LDL (mmol/l)	2.2	4.5	3.4 (0.8)
HDL (mmol/l)	0.5	1.3	0.9 (0.3)

Key: BMI-body mass index, SBP-systolic blood pressure, DBP-diastolic blood pressure, FBG-fasting blood Glucose, TC-total cholesterol, TG-triglyceride, LDL-low density lipoprotein cholesterol, HDL-high density lipoprotein cholesterol.

Table ii: shows risk factors identified in the patients

Risk factors	Frequency	Percentage (%)
HBP	12	86
NIDDM	2	14
Cigarette smoking	5	36
BMI (>25kg/m ²)	8	57
Dyslipidaemia	6	43
Number of risk factors identified		
Multiple risks	frequency	percentage(%)
None	0	0
1	5	36
2	2	14
3	2	14
4	5	36

Key: HBP-high blood pressure, NIDDM-non-insulin dependent Diabetes mellitus, BMI-body mass index.



Figure 1A: Showing anteroseptal MI in one of the patients



Figure 1B: A repeat ECG on the same patients after two days on admission



Figure 2: Apical 5-chamber view from the same patient in figure 1 showing septal hypokinesia.

Discussion

The main finding of this study is that, although MI is still not a common disease in Ilorin, the incidence of the disease has increased significantly. Fourteen cases of MI were seen within 3.5 years compared with 10 cases seen over ten years in 1990s. This result concurs with recent reports from various centres in Nigeria and from other parts of sub-Saharan Africa^{3,8,11-12}. The changing trend in the incidence of CAD in Nigeria can be attributed to the increase in the prevalence of hypertension, type 2 diabetes mellitus, obesity and reduction in the level of physical activity⁷⁻⁸. In this study, increase in cases of MI was mainly seen in males; only one female was managed for the disease. This was also observed in an earlier report¹⁰. The reason for this is not apparent but may be related to differences in hormonal make-up and low prevalence of cigarette smoking among women¹⁴. In addition, men tend to be more affluent than women in this environment. The cardiovascular risks identified were similar to the traditional risks for CAD as described in the Framingham Heart study and previously reported¹⁵. Most patients were hypertensive (85.7%) and some of them smoked cigarette (35.7%). However, only 2 patients had type 2 diabetes mellitus. Many patients had a combination of risk factors (table ii). In the management of this disease, early risk reduction is essential in order to decrease its burden. Individuals who have a combination of two or more CAD risk factors should be aggressively managed in order to prevent the occurrence of the disease¹⁶.

This study has also shown that, although the incidence of MI is increasing, the availability of facilities for investigation and treatment of CAD is lagging behind. Only one patient had opportunity to do coronary angiography (Glasgow, UK) and was found to have a severe disease. He subsequently had CABG (New Castle, UK) but unfortunately, he died suddenly in his home in Nigeria three weeks after surgery. The family objected to post-mortem examination. Our experience has shown that there are many other patients (not included in this study) who have symptoms (angina pectoris) and ECG features of CAD but do not have access to coronary angiography with or without angioplasty¹⁷.

In the light of above, there is need for community intervention through health education on early detection and treatment of hypertension, diabetes mellitus, dyslipidaemia and weight abnormalities. Campaigns for reduction of cigarette smoking should be sustained and tobacco companies should be made to put graphic signs on their packs warning users against dangers of smoking¹⁸. Efforts towards improving facilities for management, increasing awareness and case detection of CAD at peripheral hospitals should be put in place.

Limitation: Assays for cardiac markers were not done routinely until recently when tests for cardiac troponins became available. This was considered a limitation of the study.

In conclusion, the incidence of AMI is increasing among hospital admissions in Ilorin, North Central Nigeria. There is the need for establishment of cardiac catheterisation laboratories in various zones of Nigeria and international collaboration in order to help cardiothoracic centres in the country grow in the area of open heart surgery.

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