Article

Clinical presentation and treatment in patients with acute coronary syndrome in a tertiary care general hospital in Bangladesh

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Abstract: Acute coronary syndrome (ACS) is a leading cause of death among people in Bangladesh. The aim of the study was to analyze the clinical course and treatment strategies in patients with ACS and to determine to what extent management of ACS in a tertiary care general hospital in Bangladesh adhered to current guidelines. This study was carried out in the coronary care unit (CCU) of a tertiary care general hospital, Rajshahi, for a period of 3-months. A total number of 240 patients presenting with ACS were included in our study and the most common symptoms were acute chest pain (90%) and dyspnea (49%). The study group comprised of 27% female and 73% male patients with varying risk factors including hypertension (45%), hyperlipidemia (43%), family records of coronary artery disease (CAD) (20%), diabetes (17%) and smoking (15%). The most frequent ECG finding in patients was T wave change (71%), pathological Q wave (67%), ST segment elevation (33%), ST depression (9%), whereas, 12% patients with ACS reported to have normal ECG. Patients with ACS had elevated levels of SGOT and CK-MB. Troponin I level was positive in 100% of the patients with a mean peak troponin level of 1.5 ± 0.15ng/ml. In clinical setting, the patients were immediately managed with isosorbidedinitrate (58%), streptokinase (40%) and intravenous heparin (LMWH) followed by (46%) and (54%) of aspirin and aspirin-clopidogrel combinations respectively. In addition, long-term management with antihypertensive included β-blocker (58%), calcium channel blocker (29%), ACE-I (25%) and diuretics (12%). Anti-diabetic (18%) drugs were also prescribed in patients with co-existing diabetes and CAD. Adherence to guidelines is limited by lack of funds and resources in the hospital; however, attention must be paid to improve patient outcome. The average hospital stay ranges 2-3 days and hospital mortality was 10%.

Keywords: acute coronary syndrome; patients; tertiary care general hospital

1. Introduction

Coronary artery disease (CAD) is one of the major cause of cardiovascular mortality among people worldwide (Islam and Majumder, 2013). According to the WHO, 17.3 million deaths were attributable to cardiovascular disease of which 42% died as a result of myocardial infarction (Mendis *et al*., 2011). It has been reported that angina due to ischemic heart disease (IHD) affects approximately 112 million people (NHFoA, 2007) and men are more likely to have an AMI then women and that the risk of AMI increases with age (Barnett *et al*., 2001).

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The pathology underlying the development of ACS results from the erosion and rupture of a fibrous cap containing a lipid-rich atherosclerotic plaque that precipitates thrombus formation within the coronary artery, and the critical consequence is downstream myocardial ischemia [add ref]. In Bangladesh, the CVD mortality rates increased by 30-fold among males and 47-fold in females during the period of 1986-2006 (Muhit *et al.*, 2012). The prevalence of CAD is about 1.85-3.4% in rural and 19.6% in urban areas (Zaman *et al.*, 2007; Ahsan *et al.*, 2009; Saquib *et al.*, 2011).

A total of 780 patients visited National Institute of Cardiovascular Diseases (NICVD), Dhaka have lipid disorder (47%), hypertension (28%), stroke (16%), ischemic heart disease (22%) heart failure (27%) and myocardial infarction (24%) (Karar *et al.*, 2009).

Elevated levels of total cholesterol, levels of high-density lipoprotein (HDL) less than 40 mg/dL, diabetes and high blood pressure are associated with an increased risk of coronary atherosclerosis and MI (Vos *et al.*, 2012; Regnante, 2009). Several other factors contributing to the development of MI include dyslipidemia, obesity, chronic kidney disease, psychosocial condition, smoking habit, excessive physical activity and use of drugs such as non-steroidal anti-inflammatory drugs (NSAIDs) and alcohol intake (Hung *et al.*, 1995; Rutten, 2000).

The echocardiography (ECG) is usually helpful in confirming the diagnosis; however, it may be difficult to interpret if there is bundle branch block or evidence of previous MI. ECG is a very useful technique for assessing both ventricular function and other complications such as mural thrombus, cardiac rupture, ventricular septal defect, mitral regurgitation and pericardial effusion. Other techniques include chest X-ray, measurement of serum creatine kinase (CK), troponin I level (Greenlund *et al.*, 2006; Grzegorz, 2013). Creatine kinase-MB enzyme is much more cardiac specific than CK alone, and is useful for the early diagnosis of acute myocardial infarction (Nelson *et al.*, 2001) typically detectable in the serum 4-6 hours after the onset of ischemia, peaks in 12-24 hours, and normalizes in 2-3 days. Recently, an elevated levels of troponin I is considered as the most useful and predictive markers in identifying patients with acute myocardial infarction (Barnett *et al.*, 2001).

Emergency and long-term management strategies of AMI include administration of thrombolytic drugs, anti-arrhythmic, anti-hypertensive drugs such as β-blockers (metoprolol, propranolol), calcium channel blockers (amlodipine), vasodilators (nitroglycerin) and anticoagulants (Akashi, 2008; Sayeed *et al.*, 2010).

It is evident that CAD is major cause of death in present world and current guidelines are therefore, aimed at optimizing care and outcome of patients with acute coronary syndrome (Puleo *et al.*, 1989).

In the acute phase ACS patients require rapid diagnosis and early reperfusion to minimize infarct size and to prevent complications. Several factors determine treatment delay with its major contributors being patient delay such as ignorance, unaffordable cost, physician delay such as unavailability; and also lack of adequate facilities and trained person in hospitals (Bock *et al.*, 1999; Atary, 2010).

The aim of this study was to analyze the clinical presentation and treatment strategies in patients with ACS at hospital settings in a tertiary-care medical hospital in Bangladesh adhered to current guidelines.

2. Materials and Methods
2.1. Study design and settings
This cross-sectional study was carried out with an objective to assess the clinical presentation and treatment strategies in patients with ACS at hospital settings in a tertiary-care medical hospital in Bangladesh adhered to current guidelines. The study was conducted during the months October-December in 2012 at the CCU of Rajshahi Medical College, Bangladesh.

2.2. Study population and sample size
The study involved a total number of 240 patients hospitalized with the chief complaints of acute chest pain, palpitation, excessive sweating, respiratory distress, and apnea. Purposive sampling was done to find out the study population.

2.3. Data collection process
Data were collected through a semi-structured questionnaire that included admission/discharge date, clinical presentation, diagnostic tests, biochemical analysis, medication and outcomes during hospital stay. Only a few biochemical tests for serum glutamic oxaloacetic transaminase (SGOT), CK-MB and troponin I were advised within the hospital settings. Thus, the results SGOT, CK-MB and troponin I from 25 patients were collected from patients chart.

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2.4. Statistical analysis

Data was cleaned for completeness and consistencies, coded and entered in to SPSS version 20 for analysis. The results were organized, summarized and presented using appropriate descriptive measures such as text, tables, frequencies and percentage.

3. Results

During the study period, 240 patients were admitted at the CCU, Rajshahi Medical College Hospital, Bangladesh. Baseline characteristics of the patients are presented in Table 1. The study included 27% female and 73% male patients. The age of patients commonly encountering ACS ranges from 45-54 years, whereby the mean age of patient was 50±4 years. The five most common risk factors were hypertension (45%), hyperlipidemia (43%), a family history of CAD (20%), diabetes (17%) and smoking (15%) (Table 1). Most of the patients had history of cardiac abnormalities including unstable angina (21%), AMI (38%), chronic MI (40%) patients and also reported to have aortic stenosis (11%) which was unrelated to clinical presentation of ACS. The average hospital stay ranges 2-3 days and hospital mortality was 10% (Table 1).

The most of the patients were admitted with a chief complaints of chest pain in 216 (90%), dyspnea in 118 (49%), sweating in 55 (23%), nausea-vomiting in 48 (20%) and ankle edema in 24 patients (10%) (Table 2).

The characteristic changes in ECG in patients with ACS given in Table 2. The contemporary trend in monitoring the ECG changes allows distinguishing patients with acute coronary syndrome (those with unstable angina and those with Q wave infarction) on the basis of T wave inversion or ST segment depression or elevation or both. All the patients had elevated levels of SGOT, CK-MB and troponin (Table 3).

Medications used during the period of hospitalization are listed in Table 4. The majority of the patients were immediately managed by isosorbidedinitrate, streptokinase, aspirin, heparin, aspirin-clopidegrol combinations and statin during the course of hospital stay. All the patients taking either aspirin or statin alone or aspirin-clopidegrol combinations. In addition to anti-thrombotic and lipid lowering drugs long-term management with antihypertensive drugs, β-blocker, CCBs, ACE-I and diuretics. In addition anti-diabetic drugs were also prescribed in patients with diabetes and CAD. After discharge β-blocker and ACE-I were continued in most of patients in addition with aspirin, clopidogrel and statin. Patients with edema suggested to have diuretics and a few with unstable angina were requested to carry nitroglycerin spray. The patients were usually advised to take rest for couple of weeks, do not eat egg, butter, ghee, egg yolk, meat, etc and cigarette, tobacco, drugs of abuse and avoid extra salt. Finally, patients were requested to visit cardiologists if any further problem arises. Follow-up data were not available as the study conducted for short-term period. Patient died of cardiogenic shock were excluded from the study. The average hospital stay was 2-3 days and hospital mortality was 10% (Table 4).

Table 1. Baseline socio-demographic characteristics of patients (n=240).

Characteristics	Patients (%)
Sex	
Male n (%)	176 (73%)
Female n (%)	64 (27%)
Age (Mean ± SD)	50 ± 13
< 45 n (%)	28 (12%)
45-54 n (%)	86 (36%)
55-64 n (%)	80 (33%)
> 64 n (%)	46 (19%)
Risk factors n (%)	
Hypertension	108 (45%)
Hyperlipidemia	104 (43%)
Family history of CAD	48 (20%)
Diabetes	40 (17%)
Smoking	38 (15%)
Medical History of cardiac abnormalities n (%)	
Aortic stenosis	26 (11%)
Unstable angina	52 (21%)
Acute MI	92 (38%)
Chronic MI	96 (40%)

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Table 2. Clinical presentation along with ECG and cardiac biomarkers in patients with acute coronary syndrome (ACS).

Clinical Presentation	Patients (%)
Chief Complaints	
Chest pain, n (%)	216 (90%)
Dyspneoa, n (%)	118 (49%)
Vomiting, n (%)	48 (20%)
Sweating, n (%)	55 (23%)
Ankle edema, n (%)	24 (10%)

Table 3. ECG and cardiac biomarkers in patients with ACS.

Pathological changes	Mean (%)
ECG changes	
ST elevation n (%)	78(33%)
T wave change n (%)	170 (71%)
Pathological Q wave n (%)	162(67%)
ST depression n (%)	22 (9%)
Without change n (%)	30(12%)
Biomarker	
SGOT (mg/dl)	120±30
CK-MB (IU/L)	316±80
Troponin I (mg/ml)	1.57±0.15

Table 4. Treatment strategies in patients with ACS during hospital stay and discharge.

Drug n (%)	Patients (%)
Streptokinase	96 (40%)
Isosorbidedinitrate	140 (58%)
Heparin	32 (13%)
Aspirin	110 (46%)
Aspirin+ Clopidegrol	130 (54%)
Statin	104 (43%)
Proton Pump Inhibitor	240 (100%)
Calcium Channel Blocker	70 (29%)
β-blocker	140 (58%)
Diuretics	30 (12%)
ACE-I	60 (25%)
Anti-diabetic	40 (18%)

4. Discussion

This survey represents a recent clinical study on ACS report in the Bangladeshi population. The study involved a total number of 240 patients hospitalized during the 3-months period. The common symptoms were acute chest pain (90%), dyspnea (49%), sweating (23%), vomiting (20%) and ankle edema (10%). Our results were in accordance with findings of Regnante, 2009. We noticed a low rate of vomiting and nausea symptoms that were usual in other studies on ACS. Our study group comprised of 27% female and 73% male patients with numerous cardiovascular risk factors including hypertension (45%), hyperlipidemia (43%), family records of CAD (20%), diabetes (17%) and smoker (15%). Bock *et al*., 1999 reported the similar risk factors that can predispose to coronary artery disease, except the variability of occurrence.

Most of the patients (89%) had history of ACS and the remaining had aortic stenosis (11%).In the present study, ECG was performed in all patients irrespective of whether physician had provisionally diagnosed ACS or not (Zaman *et al*., 2007). Although ECG findings are of specific markers of ACS, the ECG chows low sensitivity and is of limited value for ACS diagnosis. The most frequent finding was T wave change noticed in 71% patients with ACS, followed by pathological Q wave in 67%, ST segment elevation in 33% and ST depression in 9% patient. ST-Segment elevation in precordial leads present on admission has been observed by M Islam and A Majumder, 2013 and later on there might be the appearance of pathological Q wave Saquib *et al*., 2011.

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Unlike the Ahsan *et al.*, 2009 in which 3.3% of the cases had no ECG abnormalities, our study reports only 12% of the cases with normal ECG.

All the patients had elevated levels of SGOT, CK-MB and troponin I. The average value of SGOT was 120 ± 30 mg/dl, CK-MB was 316 ± 80 U/L and troponin was 1.57 ± 0.15 mg/ml, and all the values were consistent with the patient disease outcome. Troponin I level was positive in 100% of the patients with a mean peak troponin level of 1.57 mg/ml compared with 2.7 mg/ml by Muhit *et al.*, and 2012 and 6.9 mg/ml reported by Sayeed *et al.*, 2010.

The majority of the patients were immediately managed by isosorbidedinitrate (58%), streptokinase (40%), aspirin (46%), heparin (13%), aspirin-clopidogrel combinations (54%) and statin (43%) during the course of hospital stay. Because of the clinical presentation and ECG abnormalities, most patients were initially treated for myocardial ischemia with loading doses of dual antiplatelet drugs (aspirin-clopidogrel) and intravenous heparin. There is no clear consensus on the management of patients with ACS, but most of our patients continued to receive Aspirin (ASA), β-blocker and ACE inhibitors. In addition to anti-thrombotic and lipid lowering drugs long-term management include the four most common antihypertensive drugs, β-blocker (58%), calcium channel blocker (29%), ACE-I (25%) and diuretics (12%). Anti-diabetic (18%) drugs were prescribed in patients with diabetes and coronary artery disease (Vos *et al.*, 2012; NHFoA, 2007). When medical treatment fails the patients are advised to undergo coronary angiography. Our study revealed that only a few patient (1 patient in week) suggested to undergone angiography followed by angioplasty. There were no reports of percutaneous coronary intervention (PCI).

Most of the patients (89%) had history of ACS admitted to CCU of tertiary care general hospital. Clinical presentation is indistinguishable from ACS, but the course is milder and the outcomes were better. Adherence to guidelines is limited because of the absence of physicians, skilled manpower, technician and also lacking of funds, no laboratory facilities and limited resources in the hospital setting; however, attention must be paid to improve services in CCU to properly manage the ACS and to save lives.

Our study has several limitations, such as, the data presented here is based on retrospective analysis. Secondly, the number of patients was relatively small. Thirdly, in very few cases laboratory parameters were advised. Fourthly, no follow-up data were obtained due to time limit of the study and was conducted for only three months, from October to December and this data may slightly vary from the scenario other months of the year.

5. Conclusions

The most common symptoms of patients were acute chest pain and dyspnea with varying duration and risk factors including hypertension, hyperlipidemia, family records of coronary artery disease (CAD), diabetes and smoking. The most frequent ECG finding in patients was T wave change, pathological Q wave, ST segment elevation, ST depression, whereas, patients with ACS reported to have normal ECG. Most of the patients were immediately managed by isosorbidedinitrate, streptokinase, aspirin, heparin, and aspirin-clopidogrel combinations and statin during the course of hospital stay. Constancy to standard guidelines is inadequate to properly manage the patients with ACS in a district level tertiary care hospital in Bangladesh due to patient delay and poor management facilities in hospital settings. Therefore adequate attention will be provided from patient and hospital level to overcome the uncertain attack of ACS. Furthermore the government or policy maker should give more attention for improving the management and treatment facilities in government hospital and allocating a big budget in this sector to well management of such type of leading pandemic cause of death.

Conflict of interest

None to declare.

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