

Acute Coronary Syndrome among Patients with Chest Pain: Prevalence and Common Cardiovascular Risk Factors

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Abstract

Original Research Article

Background: Chest pain not yet diagnosed), has been introduced in order to describe the subset of patients without coronary ischemic etiology of their chest pain. Chest pain is one of the common reason and Acute coronary syndrome is an important cause of chest pain. **Objective:** To assess the Prevalence of Acute Coronary Syndrome among Patients Presenting with Chest Pain and its association with common cardiovascular risk factors. **Methods:** This was an observational study conducted at Faridpur Medical College Hospital, Faridpur, Bangladesh from January to June 2022 enrolling 224 participants consecutively. Participants were interviewed focusing history of hypertension, diabetes, smoking and nature of chest pain. The diagnosis of participants whether it was acute coronary syndrome or not were recorded. Prevalence of acute coronary syndrome was calculated. Linear regression analysis was done to see the correlation with tested variables. **Results:** Out of 224 participants, 150 (66.96%) were male. Hypertension was present in 84 (37.5%), diabetes in 60 (26.78%) and 52 (23.21%) were smoker. Mean age was 51.82±14.24 years. Seventy-five (66.96%) were male. Forty-two (37.5%) were hypertensive, 60 (26.78%) were diabetes and 52 (23.21%) were smoker. Fifty-six (50%) had nonspecific chest pain, 70 (31.25%) had atypical chest pain and 42 (18.75%) had typical chest pain. Among the participants 76 (33.93%) had acute coronary syndrome. Acute coronary syndrome showed positive correlation with age, gender, nature of chest pain, hypertension and smoking. **Conclusion:** Acute coronary pattern was one of the common cause of chest pain among patients visiting emergency of a tertiary cardiac centre. We set up positive correlation of age, gender, nature of chest pain, hypertension and smoking with opinion of ACS. Cases with these threat factors need strong suspicion of ACS and prompt work up when they present with chest pain so that they can get proper operation on time.

Keywords: Acute coronary syndrome, Chest pain, Risk factors.

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INTRODUCTION

At present, early invasive management and optimal medical treatment of patients with acute coronary syndrome (ACS) is well established. Many patients admitted to hospital with chest pain suggestive of ACS, however, do not fulfil criteria for such management due to normal cardiac markers and/or no objective evidence of ischemia. The term 'non-specific chest pain' (NSCP), among many others (for example, non-cardiac chest pain, atypical chest pain, chest pain not yet diagnosed), has been introduced in order to describe the subset of patients without coronary ischemic etiology of their chest pain [1-4] Acute

coronary syndrome (ACS) is a constellation of clinical features that results from coronary artery occlusion, which is commonly due to the formation of a thrombus on a ruptured atherosclerotic plaque [5]. Close association were seen between traditional risk factors like age, gender, diabetes (DM), hypertension (HTN) smoking and family history of cardiovascular disease with diagnosis of ACS [6-8]. Substernal chest pain provoked by exertion, relieved by rest or nitroglycerin classifies chest pain into typical if it has all three characteristics, atypical if it has two characteristics and nonspecific if it has less than 2 characteristics. The spectrum of ACS includes unstable angina (UA), ST-segment elevation myocardial infarction (STEMI), and

non-STEMI (NSTEMI) [9]. Hypertension, diabetes mellitus, dyslipidemia, obesity, smoking, and a sedentary lifestyle are modifiable risk factors that predispose to ACS. Non-modifiable risk factors include genetic factors, age, gender, race, and a lower socioeconomic status [10]. Depending on the profile of ACS presentation, percutaneous coronary intervention (PCI) and thrombolytic therapy (fibrinolysis) are the two currently available therapeutic interventions capable of restoring coronary perfusion [10]. Substernal chest pain provoked by exertion, relieved by rest or nitroglycerin classifies chest pain into typical if it has all three characteristics, atypical if it has two characteristics and nonspecific if it has less than 2 characteristics. Accordingly, NSCP patients account for a significant amount of hospital resources. The European Society of Cardiology has recently stated that a large number of patients classified as low risk for an ACS (where patient history, physical examination, electrocardiogram (ECG) and cardiac biomarkers are not diagnostic) represent the most prevalent group of patients admitted to hospital with chest pain, and, thus, are the most challenging of chest pain patients [11]. We aimed to see frequency of ACS in patients presenting with chest pain in our set up and find its association with cardiac risk factors including age, gender, diabetes, hypertension, smoking and type of chest pain.

MATERIALS AND METHODS

This was an observational study conducted at Faridpur Medical College Hospital, Faridpur, Bangladesh from January to June 2022. The patients of age 18 years and above presented with complaints of chest pain were enrolled consecutively. Chest pain due to trauma, recent thoracic surgeries and local visible/documentated infections were excluded. Informed consent was taken from all the participants and those who denied for consent voluntarily were excluded. Thus a total of 224 participants were enrolled.

The patients were evaluated in detail about the nature of their chest pain focusing if the pain was substernal, provoked by exertion, relieved by rest or nitroglycerin. The pain was summarized typical if it had

all three characteristics, atypical if it had two characteristics or nonspecific if it had less than 2 characteristics. Participants' history of diabetes hypertension and smoking were obtained. The final diagnosis of the participants were confirmed if it was ACS or not. Diagnosis of ACS was confirmed according to history, electrocardiogram (ECG) and cardiac biomarkers (Creatinine phosphokinase myocardial band (CPK-MB) and /or troponin I). They were further sub classified into ST-segment elevation myocardial infarction (STEMI), Non-ST-segment elevation myocardial infarction (NSTEMI) and unstable angina. Those having 1 mm or more ST elevation in at least 2 contiguous ECG leads were categorized as STEMI but for leads V2-V3, ST elevation of at least 2 mm or more in male ≥ 40 years, 2.5 mm or more in male < 40 years and 1.5 mm or more in female was considered STEMI. Those with positive cardiac biomarker (more than 2 fold rise in CPK-MB and / or positive troponin I) but without ST elevation were categorized as NSTEMI and those with negative biomarker and without ST elevation were categorized as unstable angina.

Data Analysis

Data entry and analysis was done in Statistical Package for the Social Sciences (SPSS) version 20 for windows. Frequency, percentage distribution and mean \pm standard deviation were calculated for variables to be tested. Multiple linear regression analysis was done to see correlation of variables with diagnosis of ACS. P values were calculated and value < 0.05 were considered statically significant. R value was calculated to find strength of correlation.

RESULTS

Out of 224 patients included in our study. The age of participants ranged from 22 years to 75 years and mean age was 51.82 ± 14.24 years and 224 participants, 150 (66.96%) were male. Hypertension was present in 84 (37.5%), diabetes in 60 (26.78%) and 52 (23.21%) were smoker. Baseline characteristics of the participants is shown in Table 1.

Table 1: Baseline characteristics of the participants (N=224)

Characteristics	Value
Mean Age (Years \pm SD)	51.82 \pm 14.24
Male Gender (Frequency/Percent.)	150 (66.96%)
HTN (Frequency/Percent.)	84 (37.5%)
DM (Frequency/Percent.)	60 (26.78%)
Smoker (Frequency/Percent.)	52 (23.21%)

A total of 224 (50%) had nonspecific chest pain, 70 (31.25%) had atypical chest pain and 42 (18.75%) had typical chest pain. The characteristic

nature of the chest pain of the participants is shown in Figure 1.

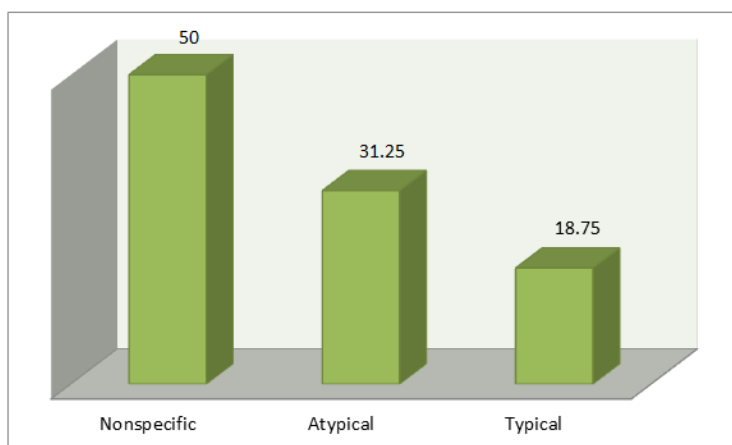


Figure 1: Nature of chest pain of participants.

Among the participants, a total of 76 (33.93%) had acute coronary syndrome. Out of them 34 (15.18%) were STEMI, 24 (10.71%) were NSTEMI and 18 (8.0%) were unstable angina. Thus among the total 76 total cases of ACS, 44.74% were of STEMI 31.59% were of NSTEMI and 23.68% were of unstable angina.

Multiple Linear regression analysis revealed significant correlation of age, gender, nature of chest pain, hypertension and smoking with diagnosis of acute coronary syndrome ($R=0.66$). The analysis of variables and their P values are shown in Table 2.

Table 2: Analysis and P values of correlation of variables with ACS (N=224)

Variables	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized coefficient B	P-value
Age	0.006	0.003	0.207	0.014
Gender	-0.170	0.080	-0.168	0.037
Nature of pain	-0.170	0.051	-0.276	0.001
HTN	0.222	0.077	0.227	0.005
DM	0.072	0.084	0.068	0.392
Smoking	0.231	0.092	0.206	0.013

DISCUSSION

To our knowledge, this analysis represents the largest observational study comparing the presenting characteristics, treatments, and outcomes of MI patients with and without chest pain in the United States. The prevalence of ACS in this study was 51.5 patients per annum, which is more than double the mean number of average cases reported (19.8 per annum per facility) in a Canadian study in 2006 across 53 large-volume hospitals [12]. We found that 1 of 3 patients diagnosed as having MI on the index admission did not have chest pain on presentation, and contrary to prior knowledge, patients with diabetes comprised less than one third of this group. This is concerning and is an area that requires further research to investigate factors contributing to the overall relatively high prevalence of ACS at the study site. In this study mean age of participants was 51.82 ± 14.24 years and about 2/3rd of them were male. In a study by Bjornson and colleagues, the mean age of participants presenting with chest pain in a Norwegian hospital was 61 ± 18 years and 57% were male [10]. In a study by Sharma and colleagues in India, maximum number of the patients presenting with chest pain were in the age group of 36-45 years and 63% of them were male [13]. In the present study

37.5% had hypertension, 26.78% had diabetes and 23.21% were smoker. Gandhi and colleague found 61.7% hypertensive, 29.79% diabetic and 34.04% smoker among the patients presenting with chest pain in India [14]. Hypertension and diabetes were present in 62.9% and 15% respectively in patient presenting with shortness of breath or chest pain in Tanzania as shown by Prattipati and colleagues [15]. However Mohamed and colleagues reported hypertension in 23.5% and diabetes in 7.4% of participants presented with non-traumatic chest pain in an urban emergency department in Tanzania [18]. Among the patients presenting with chest pain we found 33.93% cases of acute coronary syndrome. Our prevalence of ACS in patients with chest pain was in between and comparable to published literature. We found age, gender, nature of chest pain, HTN and smoking had positive correlation with the diagnosis of acute coronary syndrome in emergency. Several factors like differences in prevalence of risk factors, ethnic, racial and geographical variation, differences in the level of health care providing centres and overall health care awareness in the communities might have contributed in the difference in prevalence of ACS in patients presenting with chest pain. Several studies in the past have shown the relation of cardiovascular disease with the above mentioned risk

factors in various proportions and most of our findings in the present study was in accordance with the published literatures [19, 20].

CONCLUSION

Acute coronary pattern was one of the common cause of casket pain among actors visiting exigency of a tertiary cardiac centre. We set up positive correlation of age, gender, nature of casket pain, hypertension and smoking with opinion of ACS. Cases with these threat factors need strong dubitation of ACS and prompt work up when they present with casket pain so that they can get proper operation on time.

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