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RESEARCH ARTICLE

CLINICAL PROFILE AND OUTCOME OF PATIENTS PRESENTING WITH NON-TRAUMATIC CHEST PAIN TO EMERGENCY IN THE DEPARTMENT OF INTERNAL MEDICINE OF A TERTIARY CARE HOSPITAL IN NORTHERN INDIA

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ABSTRACT

Background: Patients presenting with chest pain are a common daily occurrence in emergency medicine. Chest pain is quite common and up to 25% of the general population experience it in some form during their lifetime. The causes for cardiac-mimicking chest pain are numerous, but the most common causes can be narrowed down by system: musculoskeletal, gastrointestinal, psychological, and pulmonary. Proper management of non-cardiac chest pain will lead to better utilization of resources, reduced health care costs, and an increased quality of life for patients. **Objectives:** To study the clinical profile and outcome of patients presenting with non-traumatic chest pain to emergency in the Department of Internal Medicine of tertiary care centre of Northern India. **Methods:** The Observational Cross-Sectional study was conducted in the emergency department of Medicine, of tertiary care center of Northern India, from 1st July 2016 to 30th June 2017, among the patients presenting with non- traumatic chest pain and who satisfied the inclusion criteria. **Results:** Out of 271 patients who reported to emergency with complaints of chest pain, 98 (36.2%) patients had CVS cause of chest pain, 65 (24%) had GIT cause, 63 (23.2%) had MSK cause, 25 (9.2%) had respiratory cause, 14 (5.2%) had psychiatric cause and 4 (2.2%) patients had other causes of chest pain. **Conclusion:** As the chest pain is the most common symptom in general practice and the present study also suggests that cardiac causes should be considered as prime cause until they are ruled out. Therefore, thorough history and physical examination should be part of initial evaluation of all patients with chest pain. However further large clinical as well as epidemiological studies with robust study design need to be conducted to confirm and further elaborate on our observations.

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INTRODUCTION

Patients presenting with chest pain are a common daily occurrence in emergency medicine. Chest pain is quite common and up to 25% of the general population experience it in some form during their lifetime (Eslick, 2003 and Fothergill,, 1993). Chest pain is the third most common reason for visits to the ED in the United States, resulting in 6 to 7 million emergency visits each year (Kasper Dennis, 2015). Some of these patients will have serious, life threatening causes of their pain, such as an acute myocardial infarction (AMI), unstable angina, pulmonary embolus, aortic dissection, and pneumothorax. Delay in diagnosis and appropriate treatment can lead to increased morbidity and mortality in these patients.

However, many patients with chest pain may have less serious disorders, for example, costochondritis, oesophageal pain, gastroesophageal reflux, mitral valve prolapse or referred GI pain. The ability to rapidly and accurately diagnose the 15–25% of patients who present with chest pain that is a manifestation of ACS is of critical importance because the short-term mortality for patients with myocardial infarction who are mistakenly discharged from the hospital is double the rate of those who are admitted (Bonaca, 2013). 50 to 80% of the patients admitted to the ED because of chest pain are eventually discharged with a diagnosis of non-cardiac chest pain or chest pain of unknown cause (Capewell, 2000). Few physicians pay attention to the potential source of the pain in this particular subgroup but focus on the risk of missing coronary disease. The causes for cardiac-mimicking chest pain

are numerous, but the most common causes can be narrowed down by system: musculoskeletal, gastrointestinal, psychological, and pulmonary. Proper management of non-cardiac chest pain will lead to better utilization of resources, reduced health care costs, and an increased quality of life for patients. The approach to chest pain, therefore, is to exclude benign conditions and to rapidly identify and treat potentially fatal and serious conditions. Limited data was available on clinical profile of patients with non-traumatic chest pain in our state. So, this study has been planned to know the clinical profile and outcome of the patients presenting with chest pain to emergency in Department of Medicine.

Aims and Objectives: To study the clinical profile and outcome of patients presenting with non-traumatic chest pain to emergency in the Department of Medicine, of tertiary care centre of Northern India.

MATERIAL AND METHODS

Study Area: The study was conducted in the department of Medicine, of tertiary care center of Northern India.

Study Duration: Period of one year from 1st July 2016 to 30th June 2017.

Study Design: Observational Cross-Sectional Study.

Study Population: All patients presenting with chief complaint of non- traumatic chest pain in emergency in the Department of Medicine and who satisfied the inclusion criteria.

Inclusion criteria

1. Patients presenting with chest pain as chief complaint
2. Patients aged ≥18 years

Exclusion criteria

1. Patients with history of trauma.
2. Patients not willing to give consent.

Methodology: All the patients who presented to emergency with complaint of chest pain and satisfies the inclusion criteria were included in the study. A written informed consent was taken from all participants. A detailed history was taken and recorded as per the case recording format. All patients were subjected to detailed clinical examination and relevant laboratory investigations as per required.

History: Three key clinical features of chest pain can help predict the risk of CAD: (1) location (2) aggravating factors and (3) alleviating factors. Chest pain with all 3 characteristics was considered angina chest pain. If only 2 ofthe 3 characteristics were present, chest pain was considered atypical angina. Non anginal chest pain, with only 1 of the 3 characteristics present. ACS included acute myocardial infarction (AMI) and unstable angina. Once a cardiac origin for the chest pain was excluded, the next evaluation was to search for evidence of significant gastro esophageal reflux. Factors that might suggest an esophageal origin included symptoms that continue over a period of hours, retrosternal pain without any lateral radiation, pain that was related to meals or that interrupted sleep, pain that was relieved by antacids, or the presence of heartburn, dysphagia, or other esophageal symptoms. Patients of NCCP of pulmonary origin may complain of chest pain that ranges from sharp and pleuritic to dull and substernal. Physical examination revealed fever, rales, decreased breath sounds or bronchial breath sounds and varying degrees of respiratory distress. Patients of NCCP of musculoskeletal origin result in an acute, well-localized, sharp chest pain. Patients, who appear otherwise well, felt increased discomfort with deep respiration or movement. Patients of NCCP of psychiatric origin had attacks of chest pain which were accompanied by any four of the following symptoms: palpitations, diaphoresis, tremor, dyspnea, choking, nausea, dizziness, derealization or depersonalization, fear of losing control or dying, paresthesia's, chills or hot flushes. All patients were subjected to haematology, biochemical tests, ECG and Chest X-Ray. Cardiac biomarkers, Echocardiography, Endoscopy and Ultrasonography was done in patients wherever required.

Statistical Analysis

Data collected was entered in excel sheet and accuracy of data entered was checked. Categorical variables were expressed as frequencies and percentages. The Chi-square test was used for comparison of the frequencies of the disease categories between the patient groups. A p-value less than 0.05 was regarded as significant. It was done using Epi Info version 7.2.2.1.

Ethical Considerations

Prior permission was obtained from the Institutional ethics committee. Free and informed consent was obtained from the patients. Participation in the study was voluntary. This study did not involve any hazardous procedure. Confidentiality of the information was maintained in accordance with the principles embodied in the Declaration of Helsinki[6] and the International guidelines for ethical review of epidemiological studies (CIOMS, 2016).

RESULTS

A total number of 271 patients of chest pain were enrolled in the study, of which 63.1% were males and 36.9% females. The mean age of the patients was 32.04±15.14 years and maximum number of the patients (31%) were in the age group of 36-45 years (Table 1).

Table 1. Age and Sex Distribution of Study Population (N=271)

Age Groups	N (%)
18-35 years	50(18.5%)
36-45 years	84(31%)
46-55 years	64(23.6%)
56-65 years	37(13.7%)
>66 years	36(13.3%)

Onset of chest pain was sudden in 157 (57.9%) patients out of which 104 (66.2%) were males. Among these 157 patients, 56.7% had cardiovascular cause of chest pain. Among patients with cardiovascular cause of chest pain, 51 (52.04%) had retro-sternal chest pain and 32 (32.65%) had left sided chest pain while 43 (66.1%) patients with GIT cause had retro-sternal chestpain. In patients with CVS cause of chest pain, 45 (45.9%) had constricting type while 34 (34.7%) had pain in form of tightness. Among patients with GIT cause of chest

pain 45 (69.2%) had burning type. Among MSK causes 34 (54%) patients had pain in form of tightness. Exertion is an aggravating factor for chest pain in 80 (29.5%) patients and all these patients had CVS cause of chest pain. Pressure over area is an aggravating factor in 33 (12.2%) patients and 32 (97%) of these had MSK cause of chest pain. 31 (11.4%) patients had meals as an aggravating factor and all had GIT cause of chest pain. 55 (20.3%) had no aggravating factor. Among all patients 176 (64.9%) patients presented with chest pain had no relieving factors while 48 (17.7%) had rest as relieving factor out of which 27 (56.2%) had CVS cause and 20 (41.7%) had musculoskeletal cause. 18 (6.6%) patients had meals as relieving factor and all these patients had GIT cause of chest pain. Among patients with chest pain 22(8.1%) had hypertension, 19(7%) were diabetics and 8 (2.9%) patients had both diabetes and hypertension. Among diabetics, 13 (68.4%) had CVS cause of chest pain and 3 (15.8%) had GIT cause of chest pain. Among hypertensives, 14 (63.6%) had CVS cause of chest pain. 87 (32.1%) patients were found to be current-smoker, 157 (57.9%) were non-smoker and 27 (10%) were ex-smokers. The percentage of cardiovascular cause of chest pain is high in current smokers as compared to non-smokers ($p<0.001$). On the contrary GIT and MSK cause of chest pain is significantly higher in non-smoker ($p<0.05$). ECG was done in all patients who presented to us with chest pain (Table 2,3).

Table 2. ECG findings among the study participants

RATE	N (%)
Normal	258 (95.2%)
Sinus Tachycardia	10 (3.7%)
Sinus Bradycardia	3 (1.1%)

Table 3. ECG changes of study participants

ST/T Changes	N (%)
Normal	203 (75%)
ST Elevation Anterior Leads	27 (10%)
ST Elevation Inferior Leads	20 (7.4%)
Q Wave AWMI	8 (3%)
ST Depression Inferior Leads	7 (2.6%)
ST Depression Anterior Leads	5 (1.8%)
Q Wave IWMI	1 (0.4%)

Out of 271 patients who reported to emergency with complaints of chest pain, 98 (36.2%) patients had CVS cause of chest pain, 65 (24%) had GIT cause, 63 (23.2%) had MSK cause, 25 (9.2%) had respiratory cause, 14 (5.2%) had psychiatric cause and 4 (2.2%) patients had other causes of chest pain. Among patients with CVS cause of chest pain 44 (44.9%) patients had ST elevated MI. 6 (6.1%) patients had stable angina, 5 (5.1%) had unstable angina and 1 (1.02%) had Post MI angina. Other CVS causes include 3 (3.1%) patients of RHD, 4 (4.1%) patients had ADHF, 2 (2.04%) had DCMP and 1 (1.02%) patient had HTN Urgency (Figure 1). In patients with respiratory causes of chest pain 6 (24%) had CA Lung, 5 (20%) had pneumothorax, 3 (12%) patients had acute PTE, pleural effusion, pneumonia, COPD, while 1 (4%) patient had empyema and ARDS. (Figure 2) Among patients with GIT cause of chest pain 52 (80%) patients had dyspepsia, 9 (13.8%) had PUD, 3 (4.6%) had pancreatitis and 1(1.5%) patient had GERD. (Figure 3) Out of total 271 patients, 156 (57.6%) were discharged from emergency and 115 (42.4%) were admitted. Among patients with CVS cause of chest pain 7 (7.1%) were discharged from emergency and 91 (92.9%) were admitted. Among patients with respiratory cause of chest pain 20 (80%) were admitted and 5 (20%) were discharged from emergency.

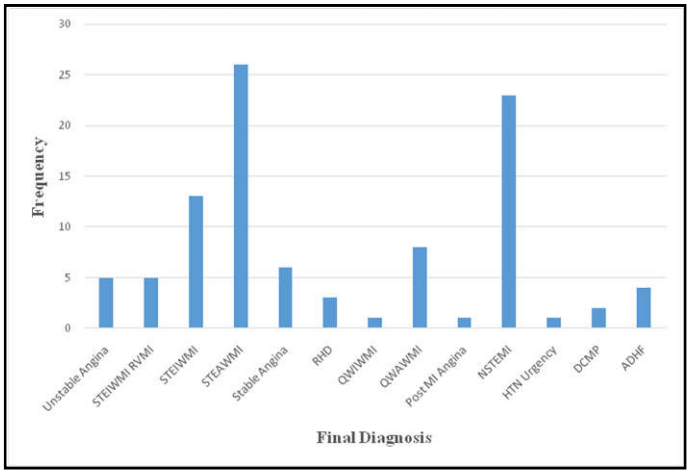

Figure 1. Cardiac causes of chest pain

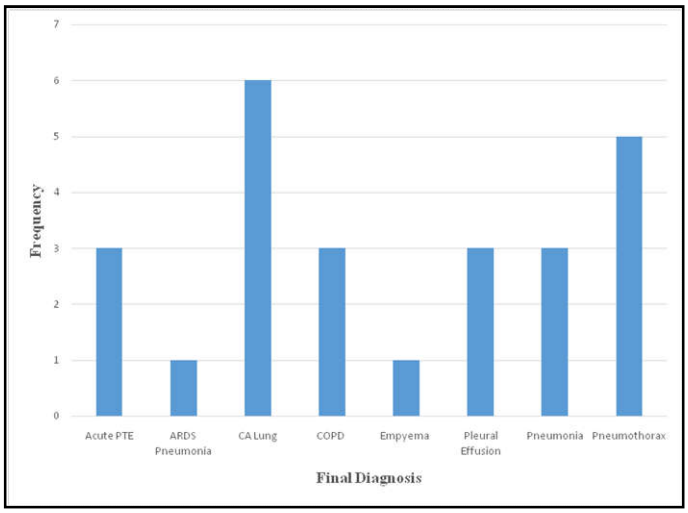

Figure 2. Respiratory causes of chest pain

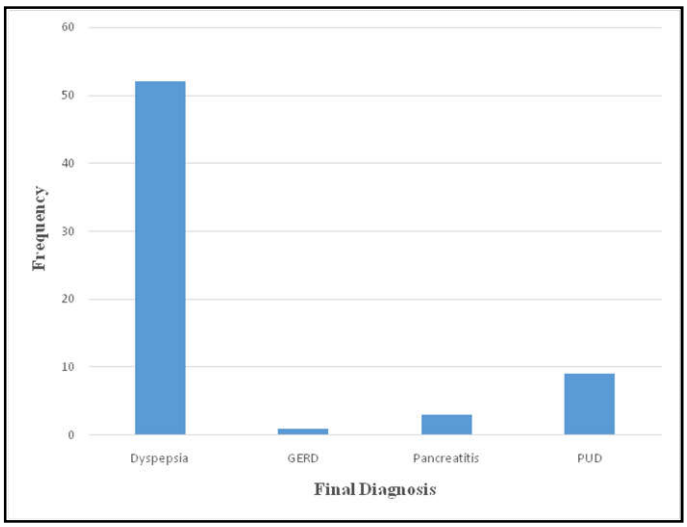

Figure 3. Gastrointestinal causes of chest pain

All patients with MSK and psychiatric causes were discharged from emergency. There was an association ($p<0.001$) between CVS, GIT and respiratory cause of chest pain and immediate outcome (Admitted/ Discharged).The proportion of CVS and Respiratory cause of chest pain is high in those admitted compared to discharged. Out of total 271 patients, 166 (61.2%) stayed in hospital for <24 hours, 14 (5.2%) for 1-3 days, 80 (29.5%) for 4-7 days and 11 (4.1%) for more than 7 days. Out

of total 271 patients, 17 (6.3%) died during their stay in hospital while 254 (93.7%) were discharged after full recovery. Among the patients who died, 14 (82.3%) were admitted with CVS cause of chest pain while rest 3 (17.7%) were admitted with respiratory cause of chest pain. The proportion of those died is high in patients with CVS cause of chest pain (82.3%) compared to all other causes of chest pain ($p<0.001$).

DISCUSSION

Inour study, out of 271 patients 63.1% were males and 36.9% were females. The age of the study participants ranged from 18 years to 85 years, with maximum number of patients (31%) were in the age group of 36-45 years. Incidence of cardiovascular cause of chest pain increases with age as 78.6% patients were above 46 years of age. In study conducted by (Paichadze Nino, 2015), where 58% were males and 39% were females. Almost 35% of patients admitted with chest pain symptoms were in the 30-45 age group. Patients with CVS cause of chest pain 45.9% had constricting type while 34.7% had pain in form of tightness. Among patients with GIT cause of chest pain 93.8% had burning type. Similarly in study of Zaimi *et al* (Zaimi Edmond, 2014) the most common type of pain was squeezing in 39.6% patients and burning pain in 11.5% patients. In our study, exertion is an aggravating factor for chest pain in 29.5% patients and all these patients had CVS cause of chest pain. In another study conducted by Jim Christenson *et al* (Christenson Jim, 2006), 32.8% patients had pain which increases with a deep breath. In the present study among patients with CVS cause of chest pain 12.2% had history of past cardiac disease while 8% patients with respiratory cause of chest pain had past history of cardiac disease. While in the study of Laurence D. Prina (Prina, 2004) pre-existing CAD was present in 27.0% patients of chest pain. In our study diabetes mellitus was found in 7% patients and hypertension was present in 8.1% patients with chest pain. 2.9% patients had both diabetes and hypertension. In another study conducted by Richard Body *et al*. (Body, 2010), hypertension was found in 49.3% patients who had AMI while Diabetes mellitus was present in 15.5% patients. In our study aetiology of chest pain is assigned to 271 patients out of which 36.2% patients had CVS cause of chest pain, 24% had GIT cause,23.2% had MSK cause, 9.2% had respiratory cause, 5.2% had psychiatric cause and 2.2% patients had other causes of chest pain. While in the study of Buntinx *et al*. (Buntinx, 2001), 7% had musculoskeletal condition, 3% had gastrointestinal disease, 54% had serious cardiovascular disease, 9% had psychiatric disease, 12% had pulmonary disease and 15% had nonspecific chest pain. Among patients with CVS cause of chest pain 44.9% had ST elevated MI, 6.1% had stable angina, 5.1% had unstable angina and 1.02% had Post MI angina. In study conducted by KJ Raihanathul *et al*. NSTEMI/ UA in 44.02% and STEMI in 55.98% patients. There was significantly high proportion of CVS and Respiratory cause of chest pain patients being admitted compared to discharged ($p<0.001$), which is similar to study of Geyser M *et al* (Geyser, 2016), in which 56% of chest pain patients were managed and discharged by the ED doctors.

Conclusion

The main causes of non-traumatic chest pain in the present study was found to be cardiovascular (36.2%) followed by gastrointestinal (24%), musculoskeletal (23.2%), respiratory (9.2%), psychiatric (5.2%) and other (2.2%). Majority of the patients were in the age group of 36-45 years. The probability of being admitted was highest for patients with cardiovascular disease, respiratory disease whereas the probability of being discharged was the highest for patients with gastrointestinal, musculoskeletal and psychiatric disorders. The presence of history of sudden onset, retrosternal exertional chest pain and/or a past medical history of diabetes, hypertension and risk factors such as smoking and/or an abnormal ECG increases the likelihood of CVS cause of chest pain, while patients with retrosternal pain with relation with meals increases likelihood of GIT cause of chest pain. The IHD was the most frequent CVS cause of chest pain, dyspepsia was most frequent cause of GIT for patients presenting in our ED. As the chest pain is the most common symptom in general practice and the present study also suggests that cardiac causes should be considered as prime cause until they are ruled out. Therefore, thorough history and physical examination should be part of initial evaluation of all patients with chest pain. However further large clinical as well as epidemiological studies with robust study design need to be conducted to confirm and further elaborate on our observations.

Conflict of Interest: None.

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