Description of chest pain patients in the Emergency Department of a central hospital in Ajman

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ABSTRACT

Chest pain accounts for 8 million visits to the Emergency Department annually, which contributes to 5% to 10% of all ED visits. A recent study revealed that between 2% to 5% of acute coronary syndrome patients visiting the emergency department were missed without being diagnosed correctly. Study design: retrospective cross sectional study, we analyzed the database in SKGH emergency department for all patients presenting with chest pain, between November 2017 and October 2019, using SPSS program. Analysis included: Demographics: age, sex, country of origin, mode of arrival Medical data: vital signs, triage grade, pain scale, seen within 72 hours or not, discharged within 7 days or not, final diagnosis and predisposition. Exclusion criteria: patients less than 18 years old, 200 patients met the inclusion criteria. results: Mean age of the studied population was 49.22 ± 12.65, Male to female ratio was 2:1, mode of transport by Walking 94 (47%), private vehicle 50 (25%) and by ambulance 31(15.5%). Majority of patients were given triage 3 (moderate pain severity) 156 (78%), mean heart rate was 87.56 ± 17.97. One hundred three were diagnosed as nonspecific chest pain (51.5%), 27 (13.5%) were diagnosed as musculoskeletal chest pain. We found that 26 patients (13%) suffered from acute myocardial infarction (18 STEMI and 8 NSTEMI). Regarding the eighteen patients with STEMI 15 (83.3%) were males and 3 (16.7%) were females, 12 sent for PCI and 6 for thrombolysis. Admitted patients were 40 (65%) with different diagnoses.

1. INTRODUCTION

Chest pain is one of the most frequent complaints in adults presenting to the Emergency Department. In the USA, chest pain accounts for 8 million visits to the Emergency Department annually, which contribute to 5% to 10% of all the ED visits [1], [2].

Identifying patients with chest pain who have acute coronary syndrome (ACS) presents a challenge to ED physicians. A recent study done in the USA revealed that between 2% to 5% of patients with ACS visiting the Emergency Department were missed without being diagnosed correctly [3- 5].

Other common causes of chest pain that can mimic ACS pain are musculoskeletal pain (25%), [6] and gastrointestinal pain (7-9%) [7].

History, physical examination, electrocardiogram (ECG), and serial measurement of troponins form the corner stone of assessment for patients with suspected ACS, however if those are unrevealing the emergency physician is faced with challenging decision whether to admit or discharge the patient especially with rising healthcare costs and increasing pressure to reduce hospitalization. Emergency physicians need to be able to risk stratify patients with chest pain to determine which patients can be safely discharged balanced with the risk of missing acute coronary syndrome.

In the USA, evaluation and managements of chest pain patients presenting to the emergency department costs 5-8 billion dollars annually [8].

Missed ACS represents more than 20% of malpractice claims against ED physicians and thus is a substantial medico legal liability [9].

2. Patients and methods

Study design: retrospective cross sectional study, we analyzed the database in SKGH emergency department for all patients presenting with chest pain, between November 2017 and October 2019, using SPSS program.

Analysis included: Demographic data: age, sex, country of origin, mode of arrival Medical data: vital signs, triage grade, pain scale, seen within 72 hours or not, discharged within 7 days or not, final diagnosis and predisposition.

Final diagnosis was differentiated to either nonspecific chest pain, musculoskeletal chest pain, abdominal pain, anxiety, GERD, gastritis, stable angina, respiratory tract infections (upper and lower), aortic dissection, pneumothorax and pulmonary embolism, Exclusion criteria: patients less than 18 years old, 200 patients met the inclusion criteria.

2.1 Ethical considerations

1. Ethical approval was taken from both SKMCA ETR department and from the research ethics committee of the ministry of health and prevention, UAE with approval reference number: MOHAP/DXB-REC/MMA /No. 38/2020
2. The collected date was kept secret for only research use.
3. Aim of the research was achieved without disturbing the work rhythm.

2.2 Statistical Analysis

All data were entered into SPSS version 23, quantitative data such as age were presented as mean and standard deviation, while qualitative data were presented as frequency and percentage. T student test and Chi-square test were used to determine the relation between gender and age with MI. A p value less than 0.05 was considered statistically significant.

3. Results

Table (1): Distribution of the studied cases according to different parameters (n = 200)

	No. (%)
Age (years)	

Mean ± SD.	44.11 ± 13.68
Median (Min. – Max.)	43 (18 - 80)
Gender	
Male	132 (66%)
Female	68 (34%)
Mode of arrival	
Wheelchair	22 (11%)
Walking	94 (47%)
Private vehicle	50 (25%)
Ambulance	31 (15.5%)
AIR	2 (1%)
Police	1 (0.5%)
Hear rate (beat / min)	
Mean ± SD.	87.56 ± 17.97
Median (Min. – Max.)	85 (52 - 145)
Respiratory rate	
Mean ± SD.	18.63 ± 1.50
Median (Min. – Max.)	18 (12 - 24)
Systolic blood pressure	
Mean ± SD.	143.14 ± 20.76
Median (Min. – Max.)	142 (97 - 206)
Diastolic blood pressure	
Mean ± SD.	85.14 ± 15.50
Median (Min. – Max.)	84 (50 - 164)
O$_2$ saturation	
Mean ± SD.	99.48 ± 1.72
Median (Min. – Max.)	100 (78 - 100)
Temperature (ºC)	
Mean ± SD.	36.83 ± 0.41
Median (Min. – Max.)	36.80 (36 – 39.90)

SD: Standard deviation

Table (2): Distribution of the studied cases according to different parameters (n = 200)

	No. (%)
Triage	
2	13 (6.5%)
3	156 (78%)
4	31 (15.5%)
Mean ± SD.	3.09 ± 0.46
Median (Min. – Max.)	3 (2 - 4)
Pain scale	
Mean ± SD.	4.06 ± 1.04
Median (Min. – Max.)	4 (1 - 7)
Seen / 72H	11 (5.5%)
Discharge / 7D	198 (99%)
ECG changes	
Not done	7 (3.5%)
No	141 (70.5%)
Yes	52 (26%)
Troponin	
Not done	46 (23%)
Normal	122 (61%)
HI	32 (16%)
Disposition	
Home	126 (63%)
Admit	38 (19%)
PCI	12 (6%)
LAMA	23 (11.5%)

Death	1 (0.5%)
OPD	1 (0.5%)

SD: Standard deviation

Table (3): Distribution of the studied cases according to final diagnosis (n = 200)

Final diagnosis	No. (%)
Acute bronchitis	5 (2.5%)
Acute coronary syndrome	9 (4.5%)
Acute pericarditis	1 (0.5%)
Angina	1 (0.5%)
Anterior MI	4 (2.0%)
Anterolateral MI	4 (2.0%)
Anteroseptal MI	2 (1.0%)
Anxiety	8 (4.0%)
Atypical chest pain	1 (0.5%)
Breast problem	1 (0.5%)
Bronchial asthma	1 (0.5%)
Bronchitis	1 (0.5%)
CHF	1 (0.5%)
Costochondritis	1 (0.5%)
Dizziness	1 (0.5%)
Gastritis	5 (2.5%)
GERD	3 (1.5%)
Inferior MI	5 (2.5%)
Lateral MI	2 (1.0%)
Left shoulder sprain	1 (0.5%)
Musculoskeletal	27 (13.5%)
Myositis	1 (0.5%)
Non specific	103 (51.5%)
NSTEMI	8 (4.0%)
Panic	1 (0.5%)
Pleuritic pain	1 (0.5%)
Posterior MI	1 (0.5%)
Rib contusion	1 (0.5%)

Table (4): Distribution of the admitted cases according to final diagnosis

Final diagnosis	No. (%)
ADMIT (n = 38)	
Acute coronary syndrome	7 (18.4%)
Angina	1 (2.6%)
Anterior MI	2 (5.3%)
Anterolateral MI	1 (2.6%)
Anteroseptal MI	1 (2.6%)
Bronchial asthma	1 (2.6%)
CHF	1 (2.6%)
Gastritis	3 (7.9%)
Inferior MI	1 (2.6%)
Nonspecific	12 (31.6%)
NSTEMI	7 (18.4%)
POSTEIOR MI	1 (2.6%)
PCI (n = 12)	
Anterior MI	2 (16.7%)
Anterolateral MI	3 (25.0%)
Anteroseptal MI	1 (8.3%)
Inferior MI	4 (33.3%)
Lateral MI	2 (16.7%)

Table (5): Distribution of the studied cases according to final diagnosis in patient Seen / 72H (n = 11)

Final diagnosis Seen / 72H	No. (%)
Acute pericarditis	1 (9.1%)
Gastritis	1 (9.1%)
Musculoskeletal	3 (27.3%)
Nonspecific	4 (36.4%)
NSTEMI	1 (9.1%)
Rib contusion	1 (9.1%)

Table (6a): Distribution of the studied cases according to age and sex in MI patients (n = 18)

	No. (%)
Age (years)	
Mean ± SD.	49.22 ± 12.65
Median (Min. – Max.)	57.5 (30 – 66)
Gender	
Male	15 (83.3%)
Female	3 (16.7%)

SD: Standard deviation

Table (6b): Relation between MI with age and sex (n = 200)

	MI		Test of	P
	No (n = 182)	Yes (n = 18)	Sig.	
Age (years)				
Mean ± SD.	43.60 ± 13.71	49.22 ± 12.65	t=	0.096
Median (Min. – Max.)	43.0 (18 – 80)	57.5 (30 – 66)	1.671	
Gender				
Male	117 (64.3%)	15 (83.3%)	χ^2=	0.104
Female	65 (35.7%)	3 (16.7%)	2.648	

SD: Standard deviation   t: Student t-test χ^2: **Chi square test**
p: p value for comparing between MI and non-MI

4. Discussion

Our study aimed to describe the chest pain patients presented to SKMCA, we retrospectively investigated the patients' files from November 2017 and October 2019.

We checked the demographic and medical information, the number and diagnosis of admitted and discharged patients,, and we followed the admitted patients to know the final diagnosis of each, and also we traced the patients who returned to the ED in 48 hours, we found that Mean age of the studied population was 49.22± 12.65, most of the studied population were males, Male to female ratio was 2:1, mode of transport was mainly by Walking 94 (47%), private vehicle 50 (25%) and by ambulance 31(15.5%). Table 1

Most of the patients were given triage 3 (moderate pain severity) 156 (78%), mean hear rate was 87.56 ± 17.97. Table 2

In the 200 study population 103 was diagnosed as nonspecific chest pain 103 (51.5%), 27 (13.5%) were musculoskeletal chest pain. Table 3

We found that 26 patients (13%) suffered from acute myocardial infarction (18 STEMI and 8 NSTEMI). Regarding the 18 patients with STEMI 15 (83.3%) were males and 3 (16.7%) were females, 12 sent for PCI and 6 for thrombolysis. Admitted patients were 40 (65%) with different diagnoses. Table 4

Similar to our study [4] found that among their studied 1819 patients, 241 (13.2%) had acute myocardial infarction.

Other studies found less percentage of myocardial infarction such as Kohn et al; 2005 who found that among their studied sample there were 10.7% with acute myocardial infarction, and pope et al; 2000 who had 8% of their studied patients with the diagnosis of acute myocardial infarction.

Regarding the patients with myocardial infarction who were missed and discharged from our emergency department, among those 8 NSTEMI patients, one was missed and returned to the ED after 24 hours, and our missing rate was 3.8% (percentage calculated from the total number of patients with a final diagnosis of myocardial infarction, which was 26 patients). Table 5

Similar to our results, Pope et al; 2000, found that Missed diagnoses of myocardial infarction for those who were not hospitalized was 2.1% (19 of 889).

Also similar to our study Shull et al; 2000 found that Rates of missed diagnoses of acute myocardial infarction at the 10 sites ranged from 0 to 11.1 percent, with 4 sites having rates of more than 1 percent, and Shing et al 2021, who had the same percentage 1-2%.

Other studies had different percentage than our results [4], as they had a missing rate of 21 (5.3%) of the 398 patients had been discharged from the emergency department without suspicion of ACS.

Also in a study my Mo et al; 2015, the missing rate was less than ours (0.9%).

We found no correlation between myocardial infarction and age or sex, probably due to the small sample size. Table 6a and 6b.

5. References

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