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Research Letter

STEMI vs NSTEMI management trends in non-invasive hospital



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ABSTRACT

Objectives: To compare the clinical features, management, and in-hospital outcomes of patients with ST elevation myocardial infarction (STEMI) and non-ST elevation acute coronary syndrome (NSTEMI), in the Western Region of Saudi Arabia.

Methods: A total of 71 patients were enrolled in a longitudinal study at a tertiary hospital without cardiac catheterization facility. These data were collected from Saudi Project for Assessment of Coronary Events registry.

Results: Twenty-three patients with STEMI were compared to 48 patients with NSTEMI. Mean age for STEMI was younger, 57.4 ± 13.7 years compared to 63.2 ± 13.9 years respectively ($p = 0.19$). Forty-four percent arrived at the hospital by ambulance. History of hypertension and hyperlipidemia were more frequent in NSTEMI ($p = 0.05$), while both groups showed no difference in diabetes mellitus, 17% vs 22% and smoking, 30% vs 17%. In-hospital medications were: Aspirin (100%) both groups, Clopidogrel (91% vs 100%) ($p = 0.03$). There was more aggressive use of beta-blockers (74% vs 95%) ($p = 0.01$) and statins (87% vs 100%) ($p = 0.01$) in NSTEMI.

In-hospital outcomes showed one recurrent myocardial infarction and one death in NSTEMI group (2%). Other outcome in the two groups showed recurrent ischemia (13% vs 29%) ($p = 0.14$) and cardiogenic shock (9% vs 2%) ($p = 0.17$). No stroke or major bleeding was reported in both groups.

Conclusion: NSTEMI patients in western province of KSA present at an older age are mostly males and have higher prevalence of hypertension and hyperlipidemia compared with STEMI patients. It is therefore important to identify patients with high-risk profile and put implement measures to reduce these factors.

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1. Introduction

Acute coronary syndrome (ACS), whether unstable angina (UA) or non-ST-segment elevation myocardial infarction (NSTEMI), collectively called NSTEMACS and ST-segment elevation myocardial infarction (STEMI) were included in our study.

The distinction is essential, as the difference is not only in the pathology but involves the method of treatment, time frame, and subsequent complication and prognosis.¹ The high prevalence of cardiovascular risk factors in Saudi Arabia influences the process of atherosclerosis and plaque formation, particularly diabetes mellitus, and requires frequent surveillance not only to the epidemiology but also to the evidence-based guided therapy.² The prevalence of CHD was reported to be 5.5% in Saudi Arabia. The annual incidence of strokes ranged from 27.6 to 57 per 100 000 in the Gulf countries, with ischemic stroke being the most common subtype and hypertension and diabetes being the most common risk factors among stroke and ACS patients. The prevalence of overweight and obesity ranged from 22% to 44%. In males, the prevalence of hypertension was from 20.9% to 57.2% and diabetes from 6% to 53.2%. The prevalence of inactivity was from 24.3% to 93.9%. Relatively more males (0.5% to 37.4%) were current smokers.³

2. Methods

These data were extracted from Saudi Project for Assessment of Coronary Events (SPACE) registry, a prospective registry of all consecutive ACS patients that were admitted to the participating hospitals. SPACE is a prospective registry for all consecutive ACS patients 18 years of age or older that were admitted to the participating hospitals. Data collected included patient's demographics, ECG findings, laboratory investigations, medical therapy, use of cardiac procedures and interventions, in-hospital outcomes, and mortality. Ethics committees at each hospital had approved the study before initiation.⁴

3. Statistical analysis

Data were summarized as means \pm SD if they were normally distributed; differences between groups were assessed using chi-square or Fisher's exact test for categorical variables, Student's t-test for continuous variables for normally distributed variables, and the Mann-Whitney *U* test for skewed variables. All analyses were considered significant at $p < 0.05$.

4. Results

71 ACS patients were enrolled from King Abdulaziz Medical City Hospital-Western Region, KSA, with no cardiac catheterization or cardiac surgery facility at the time of registry.

There were 23 (41.5%) STEMI/new LBBB and 48 (58.5%) NSTEMACS patients. Table 1 shows the baseline characteristics, CAD risk factors, clinical features upon presentation, and

Table 1 – Baseline characteristics.

	STEMI (n = 23, 41.5%)	NSTEMACS (n = 48, 58.5%)	<i>p</i> value
Mean age (SD) (years)	57.35 (13.64)	62.1 \pm 14.4	0.19
Sex			
Male	17 (73.91)	34 (70.8)	0.99
Nationality			
Saudi	21 (91.3)	46 (95.8)	0.59
BMI			
Median (IQR)	25.95 (4.9)	28.4 (6.8)	0.40
Hypertension	12 (52.17)	36 (75.0)	0.05
History of CAD	3 (13.04)	8 (16.7)	0.69
History of hyperlipidemia	8 (34.78)	29 (60.4)	0.04
New DM	5 (21.74)	7 (14.6)	0.45
PCI	1 (4.35)	13 (27.1)	0.17
Smoking status			
Current smoking	7 (30.4)	8 (16.7)	0.19
Past CVS_CABG	0	3 (6.3)	0.22
Past CVS_CVATIA	2 (8.7)	4 (8.3)	0.95
Family history of premature CAD	3 (13.04)	8 (16.7)	0.69
SBP <90	1 (4.3)	0	0.15
Killip class >1	14 (60.9)	29 (60.4)	0.97
HR >100	5 (21.7)	11 (22.9)	0.91
Ischemic chest pain	3 (13.0)	14 (29.2)	0.23
Ambulance use	10 (43.5)		

investigations for both groups. Patients tend to be younger in STEMI 57.35 \pm 13.64 years. NSTEMACS had BMI 33.3 \pm 6.7 kg/m² and higher prevalence of HTN and hyperlipidemia but no significant difference among other risk factors, e.g. history of PCI, coronary artery bypass graft (CABG) surgery, and stroke ($p > 0.05$ for all comparisons). There was more male predominance in both groups. The use of ambulance was limited to 44%. The clinical presentations were similar in the form of chest pain, heart rate and blood pressure recording values, incidence of congestive heart failure, and cardiogenic shock.

Eleven patients (48%) presented at less than 12 h of symptom onset. Only 11 patients arrived at the hospital in an ambulance and the median time from symptom onset to hospital arrival was 12.1 \pm 9.0 min. ECG was done in 11.5 \pm 6.7 min and door to needle for patients who were treated with thrombolytic therapy was 35.7 \pm 3.7 min. The most commonly used thrombolytic was t-PA (73%) followed by streptokinase (27%).

There were comparable in-hospital uses of evidence-based medications. Most of the patients received Aspirin and statins, over four-fifths received Clopidogrel and beta-blockers, and three-quarters received angiotensin converting enzyme inhibitors and/or angiotensin receptor blockers (ACE-I/ARBs). Over one-third received glycoprotein IIb/IIIa inhibitors (GP IIb/IIIa-I).

It was noted that STEMI had significantly higher number of patients who suffered moderate degree of left ventricle systolic dysfunction (Table 2).

The overall in-hospital mortality was low (1 patient, 2%). STEMI patients had higher in-hospital cardiogenic shock and heart failure (8.7% vs 2.1% and 13% vs 4.2%) but not statistically significant ($p > 0.05$ for all comparisons). The most frequent complications were recurrent ischemia 13% vs 29%, again not statistically significant between the two, whereas no stroke or major bleeding was reported (Table 3).

Table 2 – In-hospital key investigation/treatments.

	STEMI	NSTEACS	p value
Creatinine >115	9 (39.1)	13 (27.1)	0.31
Mean LDL	1.09 ± 0.42	1.04 ± 0.29	0.56
Mean TG	1.09 ± 0.29	0.56	
Aspirin on discharge	23 (100.0)	47 (100.0)	
Clopidogrel	16 (69.6)	47 (100.0)	<0.001
Beta blocker	20 (87.0)	45 (95.7)	0.322
ACE/ARB	21 (91.3)	36 (66.0)	0.039
Statins	21 (91.3)	46 (97.9)	0.25
GP IIb/IIIa-I	4 (17.4)	10 (29.4)	0.02
Echo, normal LV	0	7 (14.6)	0.05
Echo mild LV dysfunction	9 (39.1)	24 (50.0)	0.39
Echo Mod LV dysfunction	12 (52.2)	5 (10.4)	<0.001
Echo severe LV dysfunction	2 (8.7)	9 (18.8)	0.27

5. Discussion

This study was carried out to compare the clinical features, management, and in-hospital outcomes of STEMI against NSTEMI in the Western Region of Saudi Arabia. The hospital was a facility with no catheterization laboratory. Angina or chest pain was the key feature in the presentation of all ACS patients; the ECG features and cardiac markers level differentiate the STEMI from NSTEMI groups. The information can be useful in formulating policies to manage such patients.

Our result showed no significant difference in the mean age group between the STEMI and NSTEMI patients in Saudi Arabia; however, the proportion of old male patients was higher in both groups which is comparable to the other data collected in the kingdom.⁴ The prevalence of cardiovascular risk factors was significantly higher in the NSTEMI patients: hypertension (75%) and hyperlipidemia (60%). Previous data correlate with our findings in reporting higher evidence of metabolic syndrome leading to ACS in the Saudi population.^{2,5} Available data indicate poor dietary habits with high consumption of snacks, fatty foods, sugar, and fast food. Effective preventative strategies and education programs are crucial in the Gulf region to reduce the risk of CVD mortality and morbidity in the coming years.³

Our data showed reasonable compliance with guidelines of managing ACS patients with anti-ischemic drugs that either decrease myocardial oxygen demand or antiplatelet drugs.

Table 3 – In-hospital outcomes.

	STEMI	NSTEMI	p value
Inotrope	2 (8.7)	1 (2.1)	0.24
Ventilation	2 (8.7)	1 (2.1)	0.24
Death	0	1 (2.1%)	–
Recurrent MI	0	1 (2.1%)	–
Recurrent ischemia	3 (13.0%)	14 (29.2%)	0.13
Congestive heart failure	3 (13.0%)	2 (4.2%)	0.18
Cardiogenic shock	2 (8.7%)	1 (2.1%)	0.20
Stroke	0	0	
Major bleeding	0	0	

These findings lend further support to early and continuing treatment with anti-ischemic medication, in particular statin and antiplatelet in addition to blood sugar and blood pressure control so as decrease the in-hospital morbidity and mortality.

The Joint ESC/ACC Guidelines emphasize the importance of lifestyle advice for patients after a cardiac ischemic event. Our study highlights the need to improve adherence to evidence-based guidelines in order to decrease the burden of ACS and encourage our patients to commit to lifestyle changes.⁶

Although the presence of ST-elevation drives the decision to proceed to rapid reperfusion therapy, only 44% patients arrived at the hospital in an ambulance. This demonstrates the need to improve patient awareness of ACS clinical presentation and the importance of the time factor as the main line for saving the myocardial muscle. Our data had a limitation of being a small registry but they deal with the importance of addressing this disease more aggressively and collect more data to see how effective our measures are.

In contrast to multiple observational studies, there was no statistically significant difference in the in-hospital outcome between STEMI and NSTEMI patients treated medically which include recurrent myocardial infarction, recurrent ischemia, or heart failure. The nature of the progression of NSTEMI in addition to older age, hypertension, and dyslipidemia in this group of patients was factors that may be associated in in-hospital death (2.0%).^{1,7,8}

In conclusion, our result showed that Saudi ACS patients present at a relatively young age and have high rates of metabolic syndrome. Guidelines-based medications rates were high and in-hospital outcomes were low.

Conflicts of interest

The authors have none to declare.

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