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Research Article

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Primary PCI for STEMI Patients: Has Patient's Access and Hospital Outcome Improved over the Last 5 Years

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Abstract

Background: *Reperfusion therapy by Primary PCI in ST-segment elevation myocardial infarction (STEMI result in great benefit than from fibrin lytic therapy, The fast access to PPCI will improve hospital outcome, We believe that patient access to PPCI facility would have improved due to improved public awareness and expanding evidenced-based health provision.*

Method: *This is a retrospective study to analyze and compare data for STEMI patients during 2010 (Group l = 223 pts) and those treated between August 2014 and August 2015 (Group 2 = 288 pts). We compared demographic and baseline characteristics, patient's access, reason for no access and hospital mortality for the two groups.*

Results: *Among the 288 patients in G2, 247 patients (85%) were males with average age of 57 yrs. 49% were diabetics, 48% hypertensive, 48% were smokers and 27% were obese. These were not different in G1. Of G2, 164 pts (57%) only had access to PPCI compared to 56% in G1 (p = 0.536-NS). In G2, the main reasons for no PPCI was late presentation in 47% vs 53% in G1; P = 0.34-NS and 27% due to thrombolysis vs 17% in G1 (p = 0.11NS). Hospital mortality in G2 was 4% in those treated with PPCI compared to 2.3% in Gi (P = 0.522-NS). Mortality In pts who did not receive PPCI in G2 was 8% compared to 11.3% in G1 (p = 0.49-NS). Females in G2 have about 3 times higher mortality.*

Compared to 2010, pts treated for STEMI in the last 12 months at KACC still have same, relatively low access to pPCI due mainly to persistent pattern of late presentation and prior thrombolysis which reflect apparent lack of direct access to hospitals with PPCI facilities.

Conclusion: *Comparing the two periods there was no change in the practice, the low access to PPCI was mainly due to late presentation and Prior thrombolysis, Hospital mortality rate for patients treated with PPCI remained low during the two eras, this seemingly relates to both lack of public awareness and health provision factors in PPCI organizations.*

Keywords: PPCI: Primary Percutaneous Coronary Intervention; STEMI: ST Elevation Myocardial Infarction; CAD: Coronary Artery Disease; FMC: First Medical Contact; ECG: Electrocardiogram

Introduction

The Vast majority of patients with (STEMI) diagnosis arrived to facility with access to catch lab, will achieve an excellent benefit from rapid reperfusion by (PPCI) than from fibrinolytic therapy [1]. In the same time, fibrinolysis is an equal alternative for patients with no access to Cath Lab facility with PCI [2]. The American College of Cardiology/American Heart Association recommends a maximum delay of 90-min between first medical contact (FMC) and balloon inflation for primary PCI [3]. The delays of fast coronary intervention were associated with rehospitalization with heart failure, STEMI, and this may lead to more deaths [4,5].

A timely access to reperfusion therapy and cath lab facility seems to be more beneficial and significant than other treatment strategy. The initiation and development of an integrated system of care it will permit timely access to catheterization lab facilities, this will allow patients to have appropriate care within the required time. There is two important periods during MI and timing for revascularization: where the delay could happened 1) prehospital delay: It is the interval between FMC and arrival at the Cath Lab Facility, and 2) door-to-balloon (D2B) interval [6,7].

The following variables have been demonstrated to reduce D2B delay with respect to prehospital intervals: improvement of prehospital care protocols, with prehospital diagnosis of STEMI by electrocardiogram (ECG) recording and interpretation during ambulance transport; prehospital activation of cardiac catheterization laboratory; direct referral to PCI center without interhospital transfers; and emergency department (ED) bypass at the PCI center [8-10].

By reducing prehospital system delays, new and integrative approaches to STEMI patient care can improve access to PCI in rural populations that would not otherwise have timely access. The objective of our study is to evaluate whether or not any difference happened in the STEMI management between 2010 and 2015 regarding access to PPCI and awareness [11-13].

Method

Study population

This study was a retrospective, single-center, observational study conducted at King Abdulaziz cardiac Center (KACC), all patients who were admitted between August 2014-Augus 2015, with a diagnosis of STEMI was included, and classified according to their access to PPCI, and we compared the outcome with the patients who had STEMI in 2010.

Definition

STEMI patient was defined as new onset of chest pain with Electrocardiogram (ECG) criteria were ST-segment elevation of at least 0.1 mV in minimum 2 consecutive leads (0.2mV for V1-V3) or new or presumably new left bundle branch block accompanying chest pain. Serum cardiac bio-markers used to assist in the diagnosis of myocardial injury were positive.

Statistical analysis

We used student-t test to compare continuous variables and Chi-square test to compare categorical variables to assess group differences, all tests were two-sided, with a 5% level of significance. Statistical analysis was done using IBM® SPSS® version 23.

Results

A total number 288 patients (G2) was diagnosed with STEMI, 247 pts (85%) were males with average age of 57 yrs. 49% were diabetics, 48% hypertensive, 48% were smokers and 27% were obese (Table 1).

Table 1: Baseline Characteristics of Both Groups

	Group 2	Group 1
Number	288	223
Age (mean)	57y	56y
Sex (M)	85%	83%
DM	49%	52%
HTN	48%	46%
Smoker	48%	45%
Obesity	27%	26%
Hyperlipidemia	54%	52%

These were not different in (G1) 223 patients. Of G2, 164 pts (57%) only had access to PPCI compared to 56% in G1 (p = 0.536-NS) (Figure 1).

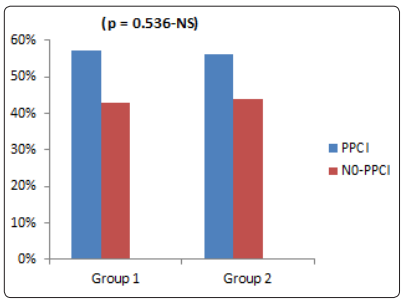

Figure 1: Showed the difference in both groups for PPCI vs NO-PPCI

In G2, the main reasons for no PPCI was late presentation in 47% vs 53% in G1; P = 0.34-NS and 27% due to thrombolysis vs 17% in G1 (p = 0.11NS) (Figure 2).

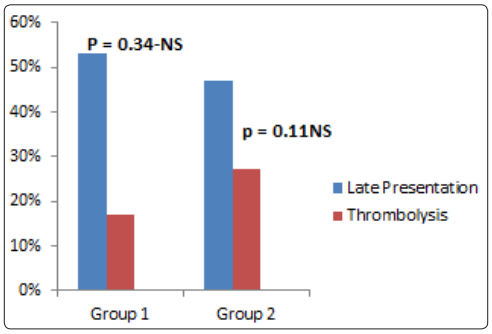

Figure 2: Showed the difference in both groups for late presentation vs Thrombolysis

Hospital mortality in G2 was 4% in those treated with PPCI compared to 2.3% in G1 (P = 0.522-NS). Mortality In pts who did not receive PPCI in G2 was 8% compared to 11.3% in GI (p = 0.49-NS) (Figure 3).

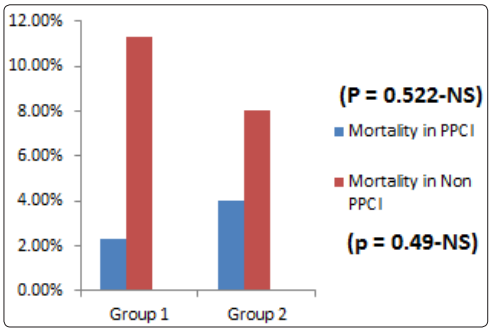

Figure 3: Showed the difference in mortality in both groups for PPCI vs Non-PPCI

Females in G2 have about 3times higher mortality. Compared to 2010, patients treated for STEMI in the last 12 months at KACC still have same, relatively low access to PPCI due mainly to persistent pattern of late presentation and prior thrombolysis which reflect apparent lack of direct access to hospitals with PPCI facilities.

Conclusion

Data from 2010 at KACC showed relatively low access to pPCI for STEMI pta primarily due to late presentation and initial thrombolysis. We believe that pta access to pPCI would have improved over the last 5 years due to improved public awareness and expanding evidenced-based health provision.

Discussion

Our study, showed in big difference occurred in the practice of STEMI management, in the period between 2010 and 2015, regarding the access to PPCI, In North American rural communities; long transport times create challenges in access to PCI for STEMI patients. Nevertheless the studies showed that patient access to PCI within a 60-min prehospital standard is possible in a regionalized PCI system, and should be encouraged [14-19].

The ground ambulance transport for patients located over 110 km from a PCI center achieved timely access. In the province of Quebec

in Canada, helicopter transfer is not available. Implementation of several evidence-based strategies helped reach that goal, including multiple prehospital ECGs; rerouting patients to the closest PCI center without interhospital transfer; activation of catheterization laboratory during ambulance transport; and ED bypass at PCI centers [13,20] The regional STEMI system was designed to achieve the benchmark of a 90-min interval between STEMI diagnosis and balloon inflation; this interval allows for a 60-min ambulance transport and 30 min for D2B inflation. Cheskes et al. defined first medical contact as the moment that paramedics arrived at the scene [15,21]. Using this definition, their system achieved a (median) 70-min interval between FMC and balloon inflation, for a median travel distance of 16.1 km and a maximum distance of 49.2 km. Other studies have used a more conservative operational definition, defining FMC as the moment that the 911 call was received [16,17]. A Danish study reported that median FMC to balloon interval was 93 min in a rural region for a maximum 100 km transport distance [17].

Terkelsen et al. proposed a nomenclature of delays that would track STEMI patients from symptom onset to balloon inflation: patient delay, followed by prehospital system delay, followed by D2B delay [4,18,20,21].

Reperfusion therapy found in our study and other was above that recommended by national and international guidelines [22,23]. In general, patients do not seek medical care until 1.5 to 2 h after the onset of pain. This reality has not changed significantly in the last 10 years, despite the implementation of specific public policies [24].

Previous studies have identified reasons for the increase in the patient's DELAY TIME, the main component of PATIENT DELAY TIME: the perception that the symptom is self-limiting, attributing the symptoms to other conditions, fear of disturbing others, fear that the symptoms are a false alarm, lack of knowledge of the importance of quick action and lack of awareness that one should call the EMS [25,26].

Conclusion

Comparing the two periods there was no change in the practice, the low access to PPCI was mainly due to late presentation and Prior thrombolysis, Hospital mortality rate for patients treated with PPCI remained low during the two era, This seemingly relates to both lack of public awareness and health provision factors in PPCI organizations, hospital mortality rate for pts treated with PPCI remained low during the two era.

Limitation of the study

This study was a single center study, and patient numbers and samples are small-sized compared with international centers.

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