Prehospital delay among cohort of Jordanian patients with acute myocardial infarction

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Over the past 20 years, advances in reperfusion therapy with angioplasty and thrombolysis have revolutionized the management of acute myocardial infarction and have led to impressive reductions in mortality. Although process of re-organization and quality assurance within hospitals have reduced median hospital arrival to initiation of reperfusion treatment time (door to needle time) from 80 minutes to as low as 30 minutes, prehospital delay has not been a broad focus of objective investigation and simple strategies for reducing prehospital delays have not been applied with the same enthusiasm as post-arrival delays.[1] Several independent predictors that have been identified by many researchers have been attributed to prehospital delay; these include sociodemographic, behavioral, clinical and situational factors.[2] The aim of the present study was to address these predictors at the local level and explore their impact. This will increase our understanding of patient's reactions and behavior at onset of symptoms of acute myocardial infarction, identify patients who are likely to delay in seeking care for acute myocardial infarction and will certainly help guiding strategies for reducing such delay in Jordan.

Our study comprised 103 consecutive acute ST segment elevation myocardial infarction patients (81 males, 22 females, mean age was 56.7 years, SD: 10.4, range: 29-78 years), who were admitted over a 12-month period (from 1/1/2003 to 31/12/2003) in the Emergency Department, Queen Alia Heart Institute, King Hussein Medical Center; a tertiary care referral center. A prospective survey was filled out by a cardiologist within 3 days of admission. The survey contains questions that answer 12 independent variables. The total prehospital delay time (PD) has been defined as the overall time in minutes from the onset of the patient's symptoms until the time of his arrival at the emergency service. In the present study, the total time (PD) was further subdivided into 3 time intervals: 1) Pdt = the interval between the onset of symptoms and the patient's decision to seek medical help. 2) Dd (decision-departure or preparatory time) = corresponds to the preparation time needed by the patient to prepare himself for departing from the house. It includes also the time needed by the ambulance or the car to arrive on the scene where the patient is located. 3) Da (departure –arrival or transportation time) = the transport time to hospital whether by ambulance or by car.

We analyzed the total prehospital delay time and its various intervals between the onset of MI symptoms and arrival to the emergency department in relation to several independent variables that were selected as possibly related to delay (**Table 1**).

All statistical analyses were performed using SPSS version 10 statistical soft ware. Continuous variables are presented as the mean value ± SD and median, and categorical variables as percentages. Univariate analysis was carried out using the one-way analysis of variance (ANOVA). Mann-Whitney U test was used for calculating p values for variables with 2 answers and Kruskal–Wallis test was used for calculation of p values that have >2 answers. A p value of less than 0.05 was regarded as significant. A p value between 0.05 and 0.1 defined a trend.

For the whole group of our study population, the mean pre-hospital total PD was 214 ± 211 minutes (median time 155 minutes). The Pd was 119 ± 176 minutes (median 60 minutes) comprising 56% of the total needed time by the patient. The transport time presented by the Da contributed to 29% of the PD time with a mean of 63 ± 83 minutes (median 30 minutes). Only 15% of the delay was attributed to the preparatory time presented by the Dd with a mean value of 32 ± 22 (median 20 minutes). Our delay times were shorter than many previously reported delay times, but still longer than the median delay times reported in the Global Registry of Acute Coronary Events (GRACE registry)[3] for those with ST-segment elevation acute myocardial infarction (3,693 patients from 14 countries) that was 2.3 hours. There were statistically significant effects of gender (p=0.001), perception of pain will disappear (p=0.004) and interpretation of pain emanating from the heart on the total prehospital delay times (p=0.003). Trends towards shorter delay times were noticed when consulting friends rather than spouse (p=0.09) and with higher social classes (p=0.81). There were trends towards longer pain–decision times when physicians are called to the house (p=0.075) and towards shorter transport time when ambulance is used as the transporting vehicle (p=0.08). No effects were noticed to severity of pain, educational level, previous history of angina or myocardial infarction. Jordanian women had considerably greater decision time, preparation time and eventually mean total pre-hospital delay time than men (345 ± 328 min versus 179 ±151 minutes, p=0.001). Women's delay

Table 1 - Effect of several variables on different prehospital time intervals.

Variables	Mean Pdt ± (SD)	Mean Dd	Mean Da	Mean Total Delay time PD	Median Total Delay time PD
Gender (%)					
Male	91 (113)	25 (28)	62 (81)	179 (151)	150
Female	221 (297)	57 (76)	67 (95)	345 (328)	230
P value	0.002	0.003	0.81	0.001	
Severity of pain					
P value (within groups)	0.37	0.59	0.26	0.88	
Person consulted (%)					
Spouse	133 (189)	36 (49)	63 (86)	233 (222)	177
Friend	69 (111)	17 (12)	62 (77)	148 (153)	110
P value	0.124	0.056	0.984	0.090	
Perception that pain will disappear (%)					
Yes	205 (214)	32 (47)	70 (105)	307 (225)	222
No	84 (145)	32 (44)	60 (73)	176 (194)	110
P value	0.001	0.996	0.583	0.004	
Interpretation of source of pain					
P value (within groups)	0.002	0.004	0.06	0.003	
Effort made (%)					
Yes	139 (186)	37 (49)	63 (90)	239 (219)	185
No	93 (162)	26 (37)	63 (73)	181 (199)	125
P value	0.091	0.221	0.99	0.175	
Call Doctors to the house (%)					
Yes	194 (278)	43 (40)	34 (42)	271 (266)	195
No	106 (151)	30 (45)	68 (87)	204 (201)	150
P value	0.07	0.308	0.143	0.264	
Vehicle used					
P value (within groups)	0.183	0.019	0.085	0.144	
Educational level					
P value (within groups)	0.605	0.011	0.100	0.122	
Social class					
P value (within groups)	0.342	0.765	0.078	0.081	
Previous history of myocardial infarction (%)					
Yes	94 (104)	15 (9)	46 (69)	155 (127)	110
No	126 (191)	37 (49)	67 (87)	229 (226)	185
P value	0.461	0.046	0.306	0.150	
Previous history of angina (%)					
P value	127 (179)	35 (46)	77 (101)	239 (219)	180
Yes	111 (175)	29 (43)	49 (58)	189 (202)	130
No	0.653	0.541	0.083	0.235	

Dd - decision-departure or preparatory time, Da - departure –arrival or transportation time, PD - prehospital delay time

seeking treatment for symptoms of acute myocardial infarction is known to be longer than man delay.[4] Those who thought their pain will disappear and is insignificant have longer delay times (p=0.004) because they will be hesitant. Only 50% of our study population reported pain as being emanating from the heart. Those have significantly shorter delay times than those who related their symptoms to other body systems (p<0.003). Our percentage is far less than previously reported figures in Sweden (85%), Ireland (67.5%) and USA (89.7%).[5] Efforts to relieve the pain were made in 59 patients (57%) and were not of significance to cause delay in any interval. Contacting a physician by phone happened in 15% of patients and caused significant delay in the decision time (194 ± 278 min versus 106 ± 151 min p=0.05). The total delay time however was not affected. Unfortunately, only 18% of our patients were transported to hospital by ambulance (low ratio in comparison to previous trials) despite being available for free. Fifty-two percent of patients who contacted non-ambulance services did that because they did not think of the ambulance service at all, which indicates that they probably did not make an active decision against calling for an ambulance. Those who used the ambulance had shorter mean decision time interval (p=0.019) and a trend towards shorter transport time (p=0.085). But with no overall significant effect on the total delay time (p=0.144). We should motivate patients to call 199. The importance of using the ambulance should be related to the possibility of starting treatment on the scene and handling life threatening complications in the ambulance. In addition, it is well known that patients who call a service other than the ambulance had their thrombolysis delayed by about an hour.[5] Patients need to understand that they should never attempt to drive themselves to the hospital if they think that they are having a heart attack and should not even let a friend or relative drive them, unless there is absolutely no other choice. Reaching the whole society by mass media campaigns or public educational programs is vital but costly especially in third world countries. Therefore, more concentration on women (delay triple those of males) and high-risk patients should be addressed. Targeted media campaigns to modify the population's behavior at the onset of acute myocardial infarction pain are surely more applicable in countries with limited resources such as Jordan.

This preliminary report has made the first advance in emphasizing the relevance of investigating prehospital delay in Jordan. Our findings should be viewed within the make up of West Amman community and the population sectors subserved by our hospital. Perhaps the most valuable lessons to draw from our findings are that traditional convictions are often wrong, education and knowledge of symptoms are vital but do not guarantee a prompt response, more concentration on women and high risk patients should be addressed and that we should motivate patients to call the ambulance service for transport.

We hope that this study will stimulate further research in this area aiming at clarifying more details about the patient's response, emotions and behavior after acute myocardial infarction. in a trial to accomplish the goal of inhibiting the process of delay at the local level.

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