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Electrocardiographic Indicators of Acute Coronary Syndrome are More Common in Patients with Ambulance Transport Compared to Those who Self-Transport to the Emergency Department Journal of Electrocardiology

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Abstract

Introduction—The American Heart Association recommends individuals with symptoms suggestive of acute coronary syndrome (ACS) activate the Emergency Medical Services' (EMS) 911 system for ambulance transport to the emergency department (ED), which enables treatment to begin prior to hospital arrival. Despite this recommendation, the majority of patients with symptoms suspicious of ACS continue to self-transport to the ED. The IMMEDIATE AIM study was a prospective study that enrolled individuals who presented to the ED with ischemic symptoms.

Objectives—The purpose of this secondary analysis was to determine differences in patients presenting the ED for possible ACS who arrive by ambulance versus self-transport on: 1) Time-to-initial hospital electrocardiogram (ECG), 2) presence of ischemic ECG changes, and 3) patient characteristics.

Methods—Initial 12-lead ECGs acquired upon patient arrival to the ED were evaluated for ST-elevation, ST-depression, and T-wave inversion.

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ECG signs of ischemia were analyzed both individually and collapsed into an independent dichotomous variable (ED ECG ischemia yes/no) for statistical analysis. Patient characteristics tested included: gender, age, race, ethnicity, English speaking, living alone, mode of transport, and presenting symptoms (chest pain, jaw pain, shortness of breath, nausea/vomiting, syncope, and clinical history).

Results—In 1299 patients (mean age 63.9, 46.7% male), 384 (29.6%) patients arrived by ambulance to the ED. The mean time-to-initial ECG was 47 minutes for ambulance patients versus 53 minutes for self-transport patients ($p<0.001$). Mode of transport was found to be an independent predictor for time-to-initial ECG controlling for age, gender, and race ($p=0.004$). There were significantly higher rates of ECG changes of ischemia for patients who arrived by ambulance versus self-transport ($p=0.02$), and patient characteristics differed by mode of transport to the ED.

Discussion—Our findings indicate that less than 30% of individuals with symptoms of ACS activate the EMS '911' system for ambulance transport to the ED. Individuals more likely to activate 911 have timelier ECG but higher rates of ischemic changes, specifically ST-depression and T-wave inversion. Individuals least likely to activate 911 are women, younger individuals, Latino ethnicity, live with a significant other, and those experiencing chest or jaw pain.

Keywords

electrocardiography; emergency department; emergency medical system; acute coronary syndrome; disparities

Introduction

Over 8 million individuals with chest pain and/or an anginal equivalent present to emergency departments (ED) each year, with over 780,000 experiencing an acute coronary syndrome (ACS).[1] Cardiovascular complaints are the second most common cause for adults to visit the ED and account for 10% of all ED visits. The American College of Cardiology/American Heart Association (ACC/AHA) recommends all persons experiencing ischemic symptoms activate 911 immediately for ambulance transport to the ED.[1] This mode of transport enables patient care to start as soon as emergency medical service (EMS) providers reach the scene of a potential acute coronary event, allowing for the early initiation of triage, risk stratification, and treatment.[2] Mode of transportation to the hospital is an important consideration for treatment delays because rapid triage and detection of myocardial ischemia/infarction are essential to reducing total ischemic burden and salving vulnerable myocardium.[3] Studies consistently demonstrate that delays in time-to-reperfusion are correlated with increased morbidity and mortality.[4,5] Efforts to reduce door-to-reperfusion times have been applied to ACS benchmarks; however it is increasingly clear that the prehospital period significantly influences patient outcomes.[6] Consequently, there has been a recent focus on time spent before hospital arrival with an emphasis on patients most vulnerable to treatment delay.[6]

ACC/AHA guidelines recommend patients with symptoms suggestive of ACS receive an initial 12-lead electrocardiogram (ECG) with interpretation within 10 minutes of being evaluated by a health care provider (Class I, Level of Evidence C).[7] The standard 12-lead ECG remains the gold standard for diagnosis of ACS and is the most widely used screening test for evaluating patients with chest pain and/or anginal equivalent symptoms. Guidelines have been extended to the prehospital setting and include acquisition of a prehospital electrocardiogram (PH ECG) for any patient activating 911 with chest pain, shortness of breath, diaphoresis, and/or other anginal equivalent symptoms.[8] Electrocardiographic signs of ischemia (ST-elevation, ST-depression, or T-wave inversion) may drive early treatment decisions such as activation of the cardiac catheterization laboratory by EMS providers or ED clinicians.[2,4,8,9] The importance of this is emphasized in cardiovascular systems of care that integrate tele-electrocardiography notification systems.[8]

Despite ongoing recommendations for patients experiencing chest pain to activate 911 for ambulance transport to the ED, the majority continue to self-transport to the hospital.[10,11] Prior studies about patients with ST-elevation myocardial infarction (STEMI) report those who self-transport have longer treatment times compared to those transported by ambulance.[12] Less is known about the association of mode of transport for other types of ACS conditions (unstable angina and non-ST-elevation myocardial infarction [NSTE-ACS]) that comprise the majority of ACS diagnoses.[1] The purpose of this study was to identify clinical correlates by modes of transport (self-transport versus ambulance transport) to the ED for patients with symptoms suspicious of any ACS condition. We aimed to identify differences by mode of transport in: 1) patient characteristics, including symptom onset to ED arrival times and outcomes, 2) time-to-initial hospital ECG, and 3) ECG changes of ischemia.

Materials and methods

A secondary analysis of data was performed using data from the Ischemia Monitoring and Mapping in the Emergency Department in Appropriate Triage and Evaluation of Acute Ischemic Myocardium (IMMEDIATE AIM) study [RO1HL69753, PI: Drew].[13] The primary aim of the IMMEDIATE AIM study was to examine sensitivity and specificity of estimated body surface potential mapping (EBSPM) for improved ECG diagnosis of ACS in the ED. Specifically, 12-lead ST-segment monitoring, using a Mason-Likar lead configuration, was compared with an EBSPM, where “optimal” electrode sites were used to create the EBSPM.[14] All patients who presented to the ED from 7am to 7pm, Monday through Friday, at the University of California San Francisco Medical Center with suspected myocardial ischemia or infarction were invited to participate. Symptoms suggestive of ACS included chest pain, shortness of breath, diaphoresis, or other anginal equivalents.

A standard 12-lead ECG was performed on arrival to the ED per standard of care, and 24-hour Holter recording was initiated (H-12 recorder, Mortara Instrument, Milwaukee, WI) for the research protocol. Research nurses trained in electrocardiography applied the electrodes and two Holter monitors for continuous ST-segment monitoring and body surface potential recordings for the first 24-hours of patient hospitalization. Patients with ventricular pacemaker rhythm or left bundle branch block were excluded due to difficulty in assessing ST-segment deviation in these patients. Members of the research team performed episodic checks on patients receiving monitoring to ensure intact electrode placement and continuous

Holter monitoring. Research nurses abstracted patient data by interview and medical records. Mode of transport was defined as self-transport (i.e. walk-in, private car, public transport, taxi transport) versus ambulance. The Institutional Review Board at the University of California, San Francisco approved the study.

Holter data were downloaded to a computer for off-line analysis using H-Scribe software (Mortara Instrument, Milwakee, WI). While the H-Scribe software performs an automatic analysis, all of the Holter data were manually over-read by an experienced cardiologist (KEF). A second investigator (JZH) performed episodic data checks on approximately 10% of patient data. The initial ECG acquired by Holter monitoring was analyzed for; (a) ST elevation, (b) ST depression, (c) T-wave inversion, or (d) nonspecific ST-T wave abnormalities (slight ST elevation, depression, or T-wave inversion). Next, the initial ECG was classified as (a) ST elevation acute MI/injury, (b) non-ST elevation ischemia/MI, (3) no ischemia/MI, or (4) unclear. Universal criteria for the diagnosis of ACS were applied to determine changes of ischemia/infarction.[7] These revised criteria consider age, sex, and lead differences to enhance sensitivity and specificity of the ECG.[7] Time to ECG was determined by ED arrival time to initial hospital 12-lead ECG acquisition.

Statistical analysis

All data analyses were performed with SPSS software version 23.0 and an alpha of .05 or less was considered to be significant. Descriptive statistics were used to report demographic and clinical information. An independent samples t-test was conducted to compare patients' ages by mode of transport and time-to-ECG; median times from symptom onset to ED arrival and peak troponin levels were compared by Mann-Whitney U tests. Multiple regression analysis was used to evaluate independent predictors of time-to-initial ECG in the ED; specifically, whether mode of transport predicted time-to-ECG, after controlling for the influence of sex, age, race, and English speaking.

Results

Patient Characteristics

A total of 1299 patients were included in this analysis. Holter recorders were maintained an average of 21(±6) hours. The sample was comprised of 606 men (46.7%) and 693 women (53.3%) with a mean age of 63.9 (±15) years. The majority of patients in the study were non-white (53% [Black, Asian, American Indian, or Pacific Islander]) and ethnicity included 11% Latino, which reflects the racial diversity in the San Francisco/Bay area of California (Table 1). Nearly one-third of the patients (n=384) activated 911 for ambulance transport while the majority self-transported to the ED (n=915). There was a significant difference in age between self-transport patients (62.6 ±15 years) and ambulance transport patients (67.3±15.4); $t(1297) = -5.235$ $p<0.001$ (two-tailed), indicating older patients were more likely to activate 911 for ambulance transport than younger patients. Chi-square testing indicated a trend for females towards being more likely to self-transport to the ED compared to males (55% vs 45%, p=0.06). Patient's identifying as Latino (n=139) were significantly more likely to self-transport than take an ambulance (11.9% vs 7.8%, p=0.03), as were patients with a significant other (n=847) compared to those who lived alone (n=446) (68% vs 32%, p=0.004).

Symptom onset to ED arrival time differed by mode of transport with ambulance patients delaying 21±97.5 hours (median=5) compared to 23 ±130 hours (median=3) for self-transport patients (Mann-Whitney test, p<0.0005). Patients with a chief complaint of syncope were more likely to be transported by ambulance (p<0.01); whereas patients experiencing more typical ACS symptoms of chest pain or jaw pain were more likely to self-transport (p<0.05) than activate 911 (Table 1). Chi-square testing showed a significant association between mode of transport and final hospital diagnosis. A significantly greater proportion of patients diagnosed with STEMI or non-STEMI (p<0.001) were transported by ambulance than self-transported; whereas patients with final diagnoses of unstable angina, a non-acute coronary syndrome condition, or a non-cardiac condition were significantly less likely to be transported by ambulance than those without (p<0.001). Ambulance transport patients had overall higher peak troponin levels than self-transport patients (4.1±12 ug/L vs 2.09±8 ug/L, p<0.0005).

ECG signs of ischemia

There were significantly higher rates of ECG changes of ischemia on the Holter generated ECG for patients who arrived by ambulance compared to those who self-transported (p=0.02). Specifically, there were higher rates of ST-depression or T-wave inversion changes for ambulance patients (Table 2) compared to those who self-transported. Yet, patients who self-transported had significantly longer mean time-to-ECG than those who were transported by ambulance (53 vs 47 minutes, p<0.001) and mode of transport was an independent predictor for time-to-ECG (Table 3). In the final model, sex, black race, and mode of transport were statistically significant, with the mode of transport variable recording the highest beta value (beta = −.104, p<0.001).

Adverse Hospital Events and 30-Day Outcomes

There were differences in adverse hospital events and 30-day follow-up outcomes by ambulance and self-transport patients (Table 4). Ambulance patients experienced more pulmonary edema/heart failure (1% vs 0.1%, p=0.03) and/or death (2.6% vs 0.9%, p=0.02) during their index hospitalization compared to those who self-transported. However, a greater proportion of ambulance patients died at 30-day follow-up than self-transport patients (4.7% vs 1.5%, p=0.01).

Discussion

Our findings indicate that less than 30% of individuals with ACS symptoms activate the EMS 911 system for ambulance transport to the ED and this impacts arrival time to initial ECG acquisition. This finding reflects patients' common misperception that private transportation is quicker than calling 911 for hospital transport, [2,15] an important contribution to the ongoing problem of patient delay which is purported to be the strongest predictor of patient mortality and morbidity outcomes.[15–18] Specifically, our findings indicate that women, younger individuals, Latino ethnicity, those who live with a significant other, and those with chest or jaw pain symptoms are less likely to activate 911; whereas patients experiencing atypical ACS symptoms, like syncope, favored ambulance transport over self-transport. These findings are consistent with prior research that indicates women with myocardial infarction are less likely to seek emergency medical care and have longer treatment times than men [15]; and, there are significant differences in cardiovascular care amongst women, minorities, and the elderly.[6,19] Bansal and colleagues (2013) examined STEMI patients (n=136) who self-presented to the ED and found them more likely to be Latino, have higher systolic blood pressure, prior history of diabetes, and an elevated initial troponin value compared to EMS-transported patients.[3] Prior studies have focused on STEMI patients only, which is a limitation because patients with NSTE-ACS comprise the majority of ACS diagnoses (70% NSTE-ACS versus 29% STEMI) according to NRMI-4 data, and the numbers of STEMI patients appears to be declining.[3,20] It might be argued that early detection of NSTE-ACS is not as urgent as that of STEMI, yet the failure to diagnose ischemia in these patients could result in delayed thrombolytic therapy or being mistakenly sent home with a non-cardiac diagnosis.

Current guidelines recommend patients with any type of suspected ACS and high-risk features (i.e. continuing chest pain, severe dyspnea, syncope, palpitations) be transferred immediately by EMS to the hospital for immediate relief of ischemia and prevention of myocardial infarction and death.[1] We found that a greater proportion of ambulance patients were diagnosed with STEMI or NSTEMI with higher peak troponin levels as compared to those who self-transported, and ambulance patients tended to be sicker as evidenced by more adverse hospital events. This pattern persisted at 30-day follow-up when significantly more self-transport patients were alive compared to those who had arrived by ambulance at the index hospitalization.

While it is encouraging that significantly more STEMI and NSTEMI patients were transported by EMS, ambulance patients had significantly longer symptom onset to ED arrival times than those who self-transported. This is an important consideration for patient delay and contradicts prior work by Fujii et al. (2014) who examined the impact of mode of transportation on symptom onset-to-door time.[21] Medical records of 416 STEMI patients were retrospectively reviewed and investigators determined that self-transport without EMS use (to either PCI or non-PCI hospitals) significantly increased symptom onset-to-door time and was the most significant factor influencing delay.[21] These investigators also reported that sicker patients (e.g. shock, high Killip classification, high GRACE scores, and syncope symptoms) more frequently used EMS as compared to more stable patients or those with chest pain symptoms and this resulted in faster time to ECG, which is similar to our findings. Prolonged hospital delay is a complex issue, and our findings suggest that patients wait until they are too sick to transport themselves to the hospital. Possible reasons for waiting are that patients do not want to inappropriately activate EMS for a “false alarm” or may not want to draw attention to themselves through the lights and sirens ambulance response; in turn, patients put themselves at risk for increased ischemic burden time and adverse outcomes. This reveals an important target for future intervention regarding patients’ recognition and acknowledgment of ACS symptoms; and underscores the necessity of ongoing attention towards reducing delay for vulnerable populations with potentially lifethreatening cardiac conditions. Reasons that patients' hesitate to activate 911 require ongoing exploration.

It is not surprising that the mode of transport influenced the time-to-initial ECG acquired in the ED. We found the mean time-to-initial ECG was 47 minutes for ambulance transport patients versus 53 minutes for self-transport patients, and that mode of transport was the strongest predictor of prolonged time-to-initial ECG acquisition controlling for age, gender, and race. These findings confer those of Bansal et al (2013) who found door-to-ECG times to be significantly longer in STEMI walk-in patients compared to EMS-transported patients (40 min vs 6 min, $p<0.0001$).[3] Our results demonstrate that door-to-ECG times increase for all patients arriving by self-transport, including women. This directly contributes to the inhospital phase of delay to treatment that has been previously described. [15,22] A prolonged door-to-ECG time has been associated with an increase in poor clinical outcomes in ACS patients; our findings underscore the complex array of factors including mode of transport that may influence delay time to treatment and in turn impact total ischemic time and mortality. [21,22]

To our knowledge, this is the first study to determine differences in the presence of electrocardiographic ischemic changes on initial ECG by mode of transport. Patients who were transported by ambulance had significantly greater rates of ST-depression, T-wave inversion, or any ischemic change (including ST-elevation) on their initial ECG than those who self-transported. This cohort tended to be sicker than the self-transport cohort as they were diagnosed with STEMI and NSTEMI more often, had greater peak troponin levels, and experienced significantly more adverse outcomes than those who self-transported. These findings are important because the presence of an abnormal ECG is the most important predictor of an ACS diagnosis.[23] We cannot determine causality in our study, but the significantly greater incidence of ST-depression or T-wave inversion for ambulance patients is important for early triage and risk stratification. Both ST-segment depression and T-wave inversion on the initial admission ECG has been shown to be associated with a higher prevalence of hypercholesterolemia, hypertension, longer history of coronary disease, prior diagnosis of ACS, and adverse hospital outcomes.[24] Early findings of ischemia provide important prognostic information and are associated with greater incidence of arrhythmias requiring intervention and cardiogenic shock.[25] While our findings are encouraging in that ambulance patients have a higher proportion of STEMI/NSTEMI diagnoses and these patients receive faster time-to-ECG, all patients who experience ischemic symptoms should be encouraged to activate 911 and not drive because of potentially prolonged ischemic burden time and risk for multiple complications like cardiac arrest. Additionally, self-transport patients who had a greater incidence of unstable angina patients may not benefit from early administration of agents in the ambulance (aspirin, morphine) that may impact myocardial ischemia which is typically transient in patients with unstable angina.

Limitations

There are several limitations to the current study. All patients were recruited from one ED at a tertiary academic urban medical center and the population reflected that of the San Francisco/Bay area which may limit the generalizability to non-academic institutions located in non-urban areas. Second, data were limited to what was collected in the parent study therefore additional data elements that may provide more information about patient delay were not available. Last, the initial hospital ECG analyzed for our research study was recorded using Holter monitoring (Mortara Instruments, Milwaukee, WI) for continuous 12-lead ECG monitoring upon ED admission. While electrodes were strategically placed in anatomically correct positions by members of the research team, the initial ECGs captured by Holter monitoring and analyzed for ischemia differed from the routine ECG acquired by hospital staff on admission to the ED. It is important to consider that different methods of ECG acquisition can result in different electrocardiographic morphologies; therefore findings may differ and should be interpreted with caution. Notably, the time-to-ECG variable reported was based on acquisition of the hospital ECG (not the Holter ECG). This is important because it reflects the “real” time-to-hospital ECG, not the time the electrodes were applied by the research nurses for the Holter acquired ECG.

Conclusions

There are significant differences in patient characteristics and clinical outcomes between patients who self-transport and those who arrive to the ED by ambulance with ischemic symptoms, and modes of transport are associated with patient delay. The majority of patients continue to self-transport to the ED resulting in longer door-to-ECG acquisition times, despite ongoing efforts to advocate the use of 911 which promotes early ECG and treatment. However, ambulance patients have more electrocardiographic signs of ischemia and longer symptom onset to ED arrival times, which may result in them being overall a sicker cohort than self-transport patients. Therefore, future interventions to improve early EMS use and decrease patient delay across all ACS patients are necessary. It is particularly important to focus on women and some minorities because these populations have longer reported delay times in response to ACS symptoms, yet have been historically underrepresented in clinical research.[15] Although regionalization of cardiac care has been shown to improve overall treatment times for disparate populations, such improvements rely on timely patient activation of EMS transport.[19] Clinicians should continue to promote patient recognition of ACS symptoms, prompt use of EMS, and incorporate early ECG monitoring strategies for rapid identification and triage of patients with ACS.

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Highlights

- The association between patients' mode of transport to the emergency department and clinical and electrocardiographic characteristics is examined.
- Women, younger individuals, Latino ethnicity, those with a significant other, and patients with chest pain symptoms are least likely to activate 911.
- Individuals who activate 911 have timelier ECG but higher rates of ischemic changes, specifically ST-depression and T-wave inversion. They also have longer symptom onset to hospital arrival times as compared to patients who self-transport.

Table 1

Patient characteristics and final hospital diagnoses comparing patients transported by self and by ambulance to the ED (n=1299).

	Total (n=1299)(%)	Self (n=915)(%)	Ambulance (n=384)(%)	P-value
Age (years), SD	1299	62.6±14.9	67.3±15.4	**<0.001**
Male	606(46.7)	411(44.9)	195(50.8)	0.06
Female	693(53.3)	504(55.1)	189(49.2)	
Race				
White	607(46.7)	418(45.7)	189(49.2)	0.06
American Indian	115(8.9)	88(9.6)	27(7.0)	
Black	284(21.9)	190(20.8)	94(24.5)	
Asian	287(22.1)	216(23.6)	71(18.5)	
Pacific Islander	6(0.5)	3(0.3)	3(0.8)	
Latino	139(10.7)	109(11.9)	30(7.8)	**0.03**
English speaking	1125(86.6)	794(86.8)	331(86.2)	0.80
Significant other	847(65.5)	621(68)	226(59.5)	**0.004**
Symptoms				
Chest pain	1123(86.5)	814(89.1)	309(80.5)	**<0.001**
Jaw pain	614(47.3)	455(49.7)	159(41.4)	**0.006**
Shortness of breath	855(65.8)	601(65.7)	254(66.1)	0.90
Nausea/vomiting	430(33.1)	303(33.1)	127(33.1)	1.00
Syncope	112(8.6)	52(5.7)	60(15.6)	**<0.001**
Symptom onset time-to-ED (hours), SD	21.7±108	21±97.5	23+/−130	**<0.001**
Medical history				
Hypercholestremia	643(49.5)	448(49)	195(50.8)	0.63
Hypertension	881(67.8)	617(67.4)	264(68.8)	0.74
Smoking history	248(19.1)	172(18.8)	76(19.8)	0.90
Diabetes	350(26.9)	250(27.3)	100(26.0)	0.58
Prior MI	327(25.2)	219(23.9)	108(28.1)	**0.05**
Angina	345(26.6)	242(26.4)	103(26.8)	0.36
CABG	158(12.2)	110(12)	48(12.5)	0.85
Prior PCI or stent	236(18.2)	163(17.8)	73(19)	0.67
Family hx of CAD	631(48.6)	470(51.4)	161(41.9)	**0.001**
Final Diagnosis				
STEMI	25(1.9)	12(1.3)	13(3.4)	**<0.001**
NSTEMI	76(5.9)	37(4.0)	39(10.2)	
Unstable angina	198(15.2)	143(15.6)	55(14.3)	
Non-ACS cardiac condition	678(52.2)	488(53.3)	190(49.5)	
Non-cardiac condition	322(24.8)	235(25.7)	87(22.7)	

STEMI=ST-elevation myocardial infarction; NSTEMI=non-ST-elevation myocardial infarction; ACS=acute coronary syndrome

Table 2

ECG Characteristics by Mode of Transport.

	Total (n=1289)(%)	Self (n=915)(%)	Ambulance (n=384)(%)	P-value
Time-to-ECG (minutes), SD		53±28	47±47	**<0.001**
ED ECG ischemia	292(22.7)	190(20.8)	102(27.1)	**0.02**
ST-elevation	62(4.9)	39(4.3)	23(6.2)	0.20
ST-depression	69(5.4)	41(4.5)	28(7.5)	**0.04**
T-wave inversion	226(17.7)	148(16.4)	78(20.9)	**0.05**

Table 3

Multiple regression analysis of predictors for time-to-initial ECG in the ED.

Predictor variables	β	95% confidence interval	P-value
Dependent variable: time-to-ECG			
Age	.067	−.005, .139	0.07
Sex	−2.326	−4.449, −.202	**0.03**
English speaking	3.072	−.137, 6.281	**0.**06
Race			
Black	−3.307	−6.084, −.531	**0.02**
American Indian	1.514	−2.336, 5.364	0.44
Asian	−.555	−3.310, 2.200	0.69
Pacific Islander	11.58	−3.666, 26.8	0.14
Mode of Transport	−6.154	−8.459, −3.849	**<0.001**

Dependent variable: time to ECG; reference variable: white race

Table 4

Adverse hospital events and 30-day follow-up for patients transported by self and by ambulance to the ED (n=1299).

Adverse event	Total (n=1299)(%)	Self-transport (n=915)(%)	Ambulance transport (n=384)(%)	P-value
Cardiac arrest	10(0.8)	4(0.4)	6(1.6)	0.07
Cardiogenic shock	6(0.5)	4(0.4)	2(0.5)	1.00
Pulmonary edema/HF	5(0.4)	1(0.1)	4(1.0)	**0.029**
AMI after admission	24(1.8)	17(1.9)	7(1.8)	1.00
Transfer to ICU	24(1.8)	13(1.4)	11(2.9)	0.11
Death	18(1.4)	8(0.9)	10(2.6)	**0.02**
30-day Follow-up outcomes				
Alive	981(76)	707(77)	274(71)	**0.005**
ED visit	208(16)	148(16)	60(16)	0.28
Admitted to hospital	143(11)	99(11)	44(11)	0.37