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Prehospital Thrombolysis: Two Years' Experience of the Community of Madrid Emergency Services (SUMMA 112)

Dos años de fibrinolisis extrahospitalaria: experiencia del SUMMA 112 en la Comunidad de Madrid

To the Editor,

In ST-segment elevation acute coronary syndrome (STEACS), maximum myocardial salvage is achieved within the first 2 h.[1] During this critical period, primary angioplasty is the reperfusion strategy of choice, and fibrinolysis is reserved for patients who are outside of this time limit.[2] Current delays in the transfer and management of these patients means that prehospital fibrinolysis (Fex) can be a complementary strategy in early treatment, but doubts remain about its efficacy and safety.

We designed a retrospective observational study that describes the clinical course of 102 patients with STEACS who received fibrinolysis from the Emergency Medical Service of the Community of Madrid (SUMMA 112) in 2007 and 2008 (5.13% of all patients with STEACS attended during the study period). Diagnostic criteria for STEACS were ischemic chest pain, ST-segment elevation and/or new-onset complete left branch bundle block. Following a strict protocol, Fex was administered if the clinical course of symptoms had lasted <3 h (or 3-6 h with time to arrival at the hospital >60 min). Two diagnostic errors occurred: one myoendocarditis and one intraparenchymal hemorrhage (patient with a low level of consciousness, severe high blood pressure and ST-segment elevation in the electrocardiogram).

Data were gathered from clinical records and SUMMA 112 Fex registers, supplemented by clinical case histories and in-hospital hemodynamic records. Survival was confirmed in June 2011 (mean follow-up, 43 [9.7] months) by consulting the Spanish national registry of deaths, the Cibeles registry, and by telephoning patients when necessary. In the descriptive analysis of the sample, quantitative variables are described as mean (standard deviation) or median [interquartile range] (asymmetric distributions) and qualitative variables as absolute and relative frequency. The Hospital Carlos III Ethics Committee approved this study.

Table 1 describes epidemiologic characteristics, risk factors, clinical data and attendance times for the series. Median values describe the typical patient as a 55 year-old man, smoker, with hyperlipidemia, high blood pressure, and chest pain; time from symptom onset to contacting the emergency services was 70 min; SUMMA 112 attended in 10 min and stabilized the patient, diagnosed STEACS, and administered fibrinolysis in 25 min; following fibrinolysis he took 38.5 min to reach the hospital.

Table 2 describes in-hospital clinical data, complications during the transfer and treatment at discharge. Six out of 10 patients presented reperfusion criteria and underwent deferred angioplasty during hospitalization. No cases of major bleeding or acute cerebrovascular accident hemorrhage due to the fibrinolytic agent were recorded. In-hospital mortality was 2% (1 patient recovered from cardiorespiratory failure but died 24 h after admission; 1 patient with multiple pathologies died of multiorgan failure on day 6). Except for a 92 year-old woman, all patients were alive at ≥2.5 years (1% mortality) after STEACS.

Our study reveals data relevant to making decisions on the optimal myocardial reperfusion strategy. Before calling for help,

Table 1
Demographic Characteristics, Risk Factors, Clinical Data and Attendance Times of the Patients Studied (n=100)

Variable	Results
Age, years	56.29±11.48
Age, years	55 [47-64.2]
Men	88 (88)
Risk factors	
Diabetes	18 (18)
Ex-smoker	14 (14)
Smoker	64 (64)
Hyperlipidemia	47 (47)
High blood pressure	39 (39)
Obesity	14 (14)
Previous case history	
AMI	5 (5)
Angina	8 (8)
Heart failure	2 (2)
Clinical data	
Anterior AMI (anterior, lateral)	54 (54)
Inferior AMI (inferior, posterior, right)	46 (46)
ST-segment depression	48 (48)
Killip I	93 (93)
Killip II	7 (7)
Killip III, IV	0
Deferred angioplasty	56 (57.7)
Rescue angioplasty	36 (37.1)
Aborted infarctions (peak troponin <1 ng/mL)	
Total	10 (10.3)
Symptoms to fibrinolysis time, min	75 [62.5-172.5]
Deferred angioplasty	9 (90)
Anterior AMI	7 (70)
Intervals, min	
Symptom onset-EMU activation	70 [45-110]
EMU activation-arrival at home	10 [6-15]
EMU activation-arrival at hospital	73 [60-89]
Symptom onset-arrival at hospital	150 [115-189]
Symptom onset-fibrinolysis	105 [73-140]
Fibrinolysis within first 2 h	
Symptom onset-fibrinolysis <60 min	15 (15)
Symptom onset-fibrinolysis <120 min	65 (65)

AMI, acute myocardial infarction; EMU, emergency medical unit.
The data express n (%), mean±standard deviation or median [interquartile range].

Table 2
In-Hospital Clinical Data, Complications During Transfer and Treatment at Discharge

Variable	Results
Other clinical data	
Heart rate, bpm	70 [55-80.2]
LVEF, %	50 [45-60]
GRACE scale	93.5 [78-113.2]
Systolic blood pressure, mmHg	130.50 [119.25-155]
Serum creatinine, mg/dL	0.90 [0.80-1.03]
Peak serum troponin, ng/mL	36.95 [4.89-120.90]
Complications during transfer	
Total	26 (26)
Ventricular fibrillation	19 (19)
Idioventricular rhythm	17 (17)
Bradycardia	2 (2)
High blood pressure	6 (6)
Minor bleeding	1 (1)
Major bleeding	0
ACVA bleeding	0
Treatment at discharge	
ACE inhibitors	68 (70.1)
Acetylsalicylic acid	89 (91.7)
Clopidogrel	84 (86.5)
Beta blockers	80 (82.4)
Calcium antagonists	4 (4.1)
Statins	89 (91.7)
Nitrates	27 (27.8)

ACE inhibitors, angiotensin converting enzyme inhibitors; ACVA, acute cerebrovascular accident; LVEF, left ventricular ejection fraction.
Data are expressed as n (%) or median [interquartile range].

patients use up more than half of the optimal time to salvage the maximum myocardial area; their transfer–due to the severity of their condition and instability–uses up the other half. Fex was administered to 65% within 120 min of symptom onset (15% at ≤60 min). This resulted in 10% aborted infarctions (peak troponin <1 ng/mL) and 58% of patients meeting reperfusion criteria on admission. Although 19% presented ventricular fibrillation before arrival at hospital, prehospital mortality was nil.

Fex substantially cuts myocardial ischemia time. Per 1000 patients receiving fibrinolysis, twice as many lives are saved if the fibrinolytic agent is administered at ≤60 min vs 60-120 min following STEACS.[3] Several studies indicate Fex, associated with non-urgent angioplasty during hospitalization, can be a safe, valid alternative with survival data comparable to or better than those of primary angioplasty.[4–6]

In the Spanish Community of Madrid, Fex is administered early, it is efficient and safe, and in this context associates with good short- and long-term survival.

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