

PROGNOSTIC FACTORS IN PATIENTS WITH MYOCARDIAL INFARCTION WITH ST ELEVATION AT 12 HOURS AFTER THE ACUTE EVENT

L. Vasiliuță¹,
T. Ciocarlie¹,
L. Petrescu²,
Rodica Avram¹

SUMMARY:

he patients with ST-elevation myocardial infarction (STEMI) are at increased risk of major cardiovascular events, especially death. In these patients, early risk stratification plays a central role, as the benefits of the modern techniques seem to be proportional to the risk of adverse effects. Although percutaneous angioplasty has significantly improved the outcome of these patients compared to fibrinolytic treatment, high-risk patients still have high mortality and morbidity rates. Our study consisted was retrospective and consisted in the analysis of 165 patients' charts admitted in the Cardiovascular Disease Institute between 2009 and 2012 with acute myocardial infarction with symptoms onset more than 12 hours upon admission which underwent PTCA. We analyzed as primary end-points end-diastolic volume and ejection fraction, and as secondary end-points mortality, reinfarction rate, NYHA IV cardiac failure and intrasent thrombosis rate. The aim of the study was to determine the predictive factors in ST-myocardial infarction patients that underwent primary angioplasty after 12 hours of the symptoms onset.

Keywords: myocardial infarction, angioplasty, fibrinolysis.

REZUMAT: Pacienții cu infarct miocardic cu supradenivelare de segment ST sunt pacienți cu risc mare de a dezvolta evenimente cardiovasculare majore, în special moarte. La acești pacienți, stratificarea precoce a riscului joacă un rol central, mai ales că beneficiile tehnicilor moderne de tratament par a fi direct proporționale cu riscul de efecte adverse. Deși angioplastia transluminală percutană a îmbunătățit semnificativ rezultatele acestor pacienți, comparativ cu tratamentul fibrinolitic, pacienții cu risc crescut prezintă încă rate mari de mortalitate și morbiditate. Studiul de față a constat în analiza foilor de observație a 165 de pacienți internați în cadrul Institutului de Boli Cardiovasculare în perioada 2009 – 2012 cu infarct miocardic acut la mai mult de 12 ore de la debut care au fost supuși PTCA. Au fost analizate ca și date primare volumul end-diastolic și fracția de ejeție, iar ca și date secundare mortalitatea, rata de reinfarct, apariția insuficienței cardiace NYHA IV și rata de tromboză intrastent. Scopul studiului de față a fost de a sublinia factorii de prognostic la pacienții cu infarct miocardic cu supradenivelare de segment ST supuși angioplastiei percutane la mai mult de 12 ore de la debutul simptomatologiei.

Cuvinte cheie: infarct miocardic, angioplastie, fibrinoliză.

Received for publication: 11.11.2013

Revised: 26.11.2013

1 - University of Medicine and Pharmacy "Victor Babes" Timișoara, Romania

2- Cardiovascular Disease Institute, "Victor Babes" University of Medicine and Pharmacy Timisoara

INTRODUCTION

The superiority of primary percutaneous angioplasty over fibrinolysis has been demonstrated in several studies.(1-3) It has been observed that the benefit of primary angioplasty is different in each group of patients and the benefit is greatest in those at high risk. Thus, the stratification prior to intervention has great clinical importance to identify this group of patients at higher risk and to optimize their therapeutic management.

OBJECTIVE

We analyzed as primary end-points end-diastolic volume and ejection fraction, and as secondary end-points mortality, reinfarction rate, NYHA IV cardiac failure and intrasent thrombosis rate. The aim of the study was to determine the predictive factors in ST-myocardial infarction patients that underwent primary angioplasty after 12 hours of the symptoms onset.

MATERIAL AND METHODS

The studied sample consisted of 165 patients admitted for acute myocardial infarction with symptom onset for more than 12 hours upon admission in the Cardiology Department, Cardiovascular Disease Institute Timisoara from 2009 until 2013. The studied parameters were recorded at the time of the procedures, at 1 and at 3 months after that.

Including criteria were symptoms onset more than 12 hours upon admission and ST segment elevation for more than 2 mm in at least 2 ECG derivations.

Excluding criteria were left bundle branch block, coronary trunk stenosis with surgical indication, triple

artery involvement, mechanical ventilation upon admission, past CABG procedures, usage of thrombus aspiration catheter.

Primary endpoints are telediastolic volume (VTD) and ejection fraction (FE). Secondary endpoints are mortality rate, reinfarction rate, NYHA IV cardiac insufficiency and intrastent thrombosis. We calculated for the studied sample the TIMI risk score (Table 1.).

Statistical analysis was performed with SPSS 13.0 software.

RESULTS AND DISCUSSIONS

The patients' demographic data are presented in table 2.

Current sample consisted of 165 patients with ST-supradenivelation myocardial infarction.

We analyzed the TIMI score for these patients. The TIMI score is a simple prognostication scheme that categorizes a patient's risk of death and ischemic events and provides a basis for therapeutic decision making.(4) Score interpretation is the risk percentage at 14 days: all-cause mortality, new or recurrent myocardial infarction or severe ischemia requiring urgent revascularization.(4)

Score interpretation is, as follows: score of 0-1 = 4.7% risk, score of 2 = 8.3% risk, score of 3 = 13.2% risk, score of 4 = 19.9% risk, score of 5 = 26.2% risk, score of 6-7 = 40.9% risk.

We also believe that the TIMI score applied to these patients without cardiogenic shock who undergo primary angioplasty predicts in-hospital mortality.

From the studied sample, 44.84% of patients were having diabetes mellitus, 81.81% arterial hypertension, 53.93 were included in Killip class II-III. The mean

Table 1. TIMI risk score for STEMI.

Criteria	Points
Age > 75 y.o.	3
Age between 65-74	2
Diabetes mellitus or arterial hypertension or angina	1
Systolic blood pressure < 100 mmHg	3
Heart rate > 100 bpm	2
Killip class II-IV	2
Weight < 67 kg	1
Anterior ST segment elevation or left bundle branch block	1
Time to treatment > 4 hours	1

Table 2. Table 2. Demographic data for the studied sample.

Demographic data	Values
Age	61.4 (54.3 – 69.1)
Male	93 (56.4%)
Female	72 (43.6%)
Smokers	93 (56.36%)
BMI (kg/mp)	30.4
Arterial hypertension	135 (81.82%)
Hyperlipidemia	116 (70.30%)
Prior myocardial infarction	34 (20.60%)
Renal disease	19 (11.51%)
Stroke	13 (7.87%)

Table 3. Clinical presentation and coronary artery involvement

Parameter	Patients
Killip III class (acute pulmonary oedema)	7 (4.24%)
Killip IV (cardiogenic shock)	4 (2.42%)
Ventricular arrhythmias	6 (3.63%)
Type III atrio-ventricular block	11 (6.67%)
Right coronary artery	53 (32.12%)
Circumflex coronary artery	27 (16.36%)
Left coronary artery	85 (51.51%)
One vessel involvement	94 (56.96%)
Two vessels involvement	71 (43.03%)

Table 4. In-hospital endpoints

Parameters		Patients	
		N	%
Telediastolic volume	> 155 ml	99	60
	< 155 ml	66	40
Ejection fraction	> 55%	35	21.21
	40-55%	60	36.36
	35-40%	60	36.36
	< 35%	10	6.06
Mortality rate		5	3.03
Re-infarction rate		8	4.84
NYHA IV Cardiac Insufficiency		10	6.06
Intrastent thrombosis		7	4.24

ejection fraction measured by echocardiography was 45.74 ±10.2% and 6.06% of patients were having an ejection fraction under 35%. The distribution of patients according to TIMI score is listed in the next table.

Table 5. TIMI risk score for the studied sample.

Criteria	Patients (No)	Patients (%)
Age > 75 y.o.	38	23.03
Age between 65-74	65	39.39
Diabetes mellitus	74	44.84
Arterial hypertension	135	81.81
Angina	101	61.21
Systolic blood pressure < 100 mmHg	35	21.21
Heart rate > 100 bpm	42	25.45
Killip class I	76	46.06
Killip class II	82	49.69
Killip class III	7	4.24
Killip class IV	4	2.42
Weight < 67 kg	23	13.93
Anterior ST segment elevation or left bundle branch block	75	45.45
Time to treatment > 4 hours	165	100

Table 6. TIMI score distribution.

TIMI score	Patients (No)	Patients (%)
0	12	7.27
1	7	4.24
2	33	20
3	24	14.54
4	44	26.66
5	18	10.9
6	13	7.87
7	14	8.48
>8	4	2.42

Table 7. In hospital mortality and adverse effects.

	Total	TIMI 0-4	TIMI > 5	P
Death	5 (3.03%)	0	5 (3.03%)	< 0.01
Reinfarction rate	8 (4.84%)	3 (1.81%)	5 (3.03%)	0.001
Stroke	2 (1.21%)	0	2 (1.21%)	0.0001
Heart failure	10 (6.06%)	4 (2.42%)	6 (3.63%)	< 0.001
Intrastent thrombosis	7 (4.24%)	2 (1.21%)	5 (3.03%)	< 0.01
Ventricular arrhythmias	7 (4.24%)	3 (1.81%)	4 (2.42%)	0.12

The in-hospital mortality was 3.03%, all patients and a high risk patient with a TIMI score above 5 (45 having a TIMI score above 8. We considered a low risk patients – 27.27%). The TIMI score was a very good predictor for in-hospital mortality (p < 0.01). Lev et al.(5)

reported that stratification with TIMI score in patients undergoing primary angioplasty is a good predictor of mortality and major adverse cardiac events (myocardial infarction, death).

We are aware that TIMI score was developed to predict mortality, but it also identifies a group of high-risk patients (a score above 5), who have an increased frequency of adverse effects, such as heart failure or ventricular arrhythmias.

CONCLUSIONS

We applied the TIMI score in STEMI patients, undergoing primary angioplasty. This score predicted not only in-hospital mortality, but other adverse effects such as stroke, or ventricular arrhythmias, reinfarction rate or heart failure.

References:

1. Van de Werf F, Ardissino D, Betriu A, et al. Management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J* 2003;24:28–66.
2. Fibrinolytic Therapy Trialists' (FTT) Collaborative Group. Indications for fibrinolytic therapy in suspected acute myocardial infarction: collaborative overview of early mortality and major morbidity results from all randomized trials of more than 1000 patients. *Lancet* 1994;343:311–322.
3. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. *Lancet* 2003; 361:13– 20.
4. Elliott M. Antman, MD; Marc Cohen, MD; Peter J. L. M. Bernink, MD; Carolyn H. McCabe, BS; Thomas Horacek, MD, "The TIMI Risk Score for Unstable Angina/NonST Elevation MI", *JAMA*, 2000.
5. Lev EI, Kornowski R, Vaknin-Assa H, et al. Comparison of the predictive value of four different risk scores for outcomes of patients with ST-elevation acute myocardial infarction undergoing primary percutaneous coronary intervention. *Am J Cardiol* 2008; 102:6–11.