

THE IMPACT OF PRIMARY ANGIOPLASTY IN DIABETICS VERSUS NON-DIABETICS PATIENTS WITH MYOCARDIAL INFARCTION WITH ST ELEVATION AT 12 HOURS AFTER THE ACUTE EVENT

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SUMMARY:

It is well known that the diabetic patients have a poor prognosis after transluminal percutaneous angioplasty for acute myocardial infarction. We need to mention the benefit of stenting in patients presenting with acute myocardial infarction at more than 12 hours after symptoms onset. Brave- 2 study concluded that primary angioplasty reduces the infarction scar in these patients. 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. In conclusion, the diabetes has a negative impact on PTCA success in patients presenting at more than 12 hours until symptoms onset.

Keywords: primary angioplasty, diabetes mellitus, myocardial infarction.

REZUMAT: Este cunoscut faptul că pacienții diabetici au un factor de prognostic mai prost post angioplastie transluminală percutană pentru infarct miocardic acut. Un alt aspect demn de menționat este beneficiul stentării la pacienții care se prezintă la mai mult de 12 ore după debutul simptomelor, în acest sens studiul BRAVE-2 menționând faptul că angioplastia primară reduce dimensiunea cicatricii postinfarct la acești pacienți. 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. Ca și concluzii, diabetul influențează negativ rata de succes a angioplastiei transluminale percutane la pacienții ce se prezintă la mai mult de 12 ore de la debutul simptomatologiei.

Cuvinte cheie: angioplastie primară, diabet zaharat, infarct miocardic.

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INTRODUCTION

Diabetes is an independent risk factor for the development of coronary artery disease (CAD).(1)

Patients with diabetes have considerably higher mortality and morbidity rates than non-diabetic patients. Although diabetic patients have more severe baseline characteristics than non-diabetics, most studies concur that diabetes mellitus independently predicts morbidity and mortality after acute myocardial infarction (AMI).(2) Diabetic patients treated for CAD with percutaneous transluminal coronary angioplasty (PTCA) appear to have a particularly unfavorable prognosis compared with nondiabetic patients.

Another aspect is that 8.5-40% of STEMI patients came into emergency room at over 12 hours after symptom onset. Brave 2 study shows that primary angioplasty reduces the scar dimension in STEMI patients even after 12-48 hours after symptoms onset.(3)

OBJECTIVE

The present study compares two different populations of STEMI patients - diabetics versus non-diabetics in

terms of primary and secondary endpoints. Primary endpoints are telediastolic volume and ejection fraction. Secondary endpoints are mortality rate, reinfarction rate, NYHA IV cardiac insufficiency and intrastent thrombosis.

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.

All procedural decisions, including device selection and adjunctive pharmacotherapy, were made at the

Table 1. Demographic data for the studied sample.

Demographic data	Patients with Diabetes Mellitus	Patients without Diabetes Mellitus
Age	59.3 (54.3 – 69.1)	63.2 (59.2 – 78.4)
Male (93 – 56.4%)	43 (46.2 %)	50 (53.7%)
Female (72 – 43.6%)	48 (66.6%)	24 (33.3%)
Smokers	41 (44.08%)	52 (72.22%)
BMI (kg/mp)	31.5	29.3
Arterial hypertension	86 (92.4%)	49 (68.05%)
Hyperlipidemia	65 (69.89%)	51 (70.83%)
Prior myocardial infarction	23 (24.73%)	11 (15.27%)
Renal disease	12 (12.9%)	7 (9.7%)
Stroke	8 (8.6%)	5 (6.9%)

Table 2. Clinical presentation and coronary artery involvement.

Parameter	Patients with Diabetes Mellitus	Patients without Diabetes Mellitus	p value
Killip III class (acute pulmonary oedema)	5 (5.37%)	2 (2.7%)	0.063
Killip IV (cardiogenic shock)	3 (3.2%)	1 (1.38%)	0.25
Ventricular arrhythmias	4 (4.3%)	2 (2.77%)	0.036
Type III atrio-ventricular block	6 (6.45%)	5 (6.94%)	< 0.001
Right coronary artery	32 (34.4%)	21 (29.16%)	0.09
Circumflex coronary artery	15 (16.12%)	12 (16.66%)	< 0.001
Left coronary artery	46 (49.46%)	39 (54.16%)	< 0.01
One vessel involvement	46 (49.46%)	48 (66.67%)	< 0.001
Two vessels involvement	47 (50.53%)	24 (33.33%)	0.386

discretion of the individual physician. Stents were deployed at high pressure, and patients were maintained on ticlopidine or clopidogrel for 4 weeks in addition to aspirin following implantation unless contraindicated. Cardiac enzymes (creatine kinase and creatine kinase MB isoenzyme or troponin) were obtained by protocol before and at 8 and 24 h following PCI.

Primary endpoints are telediastolic volume (VTD) and ejection fraction (FE). Secondary endpoints are mortality rate, reinfarction rate, NYHA IV cardiac insufficiency and intrastent thrombosis. The follow-up was at one month and at three months.

Statistical analysis was performed with SPSS software. Differences between diabetic and nondiabetic

patients were compared using 2 statistics for categorical variables and t tests for continuous variables. A p value <0.05 was considered statistically significant.

RESULTS AND DISCUSSIONS

The patients' demographic data are presented in table 1.

The presence of diabetes has long been associated with higher rates of long-term adverse events for patients undergoing PTCA. High restenosis rates, persistent hemostatic abnormalities, and uninterrupted progression of atherosclerosis potentially contribute to the poor outcomes seen among diabetic patients treated with

Table 3. In-hospital endpoints.

Parameters		Patients with Diabetes Mellitus		Patients without Diabetes Mellitus		P value
		N	%	N	%	
<u>Telediastolic volume</u>	> 155 ml	51	54.83	48	66.67	< 0.01
	< 155 ml	42	45.16	24	33.33	0.891
<u>Ejection fraction</u>	> 55%	21	22.58	14	19.44	< 0.001
	40-55%	27	29.03	33	45.83	0.114
	35-40%	39	41.93	21	29.16	< 0.001
	< 35%	6	6.4	4	5.55	< 0.001
<u>Mortality rate</u>		3	3.22	2	2.7	0.831
<u>Re-infarction rate</u>		5	5.37	3	4.16	0.723
<u>NYHA IV Cardiac Insufficiency</u>		6	6.45	4	5.55	0.227
<u>Intrastent thrombosis</u>		4	4.3	3	4.16	0.912

Table 4. One month end-points.

Parameters		Patients with Diabetes Mellitus		Patients without Diabetes Mellitus		P value
		N	%	N	%	
<u>Telediastolic volume</u>	> 155 ml	35	38.88	38	54.28	< 0.01
	< 155 ml	55	61.11	32	45.71	< 0.01
<u>Ejection fraction</u>	> 55%	27	30	21	30	0.225
	40-55%	37	41.11	39	55.71	0.356
	35-40%	21	23.33	8	11.42	0.065
	< 35%	4	4.44	2	2.85	0.002
<u>Mortality rate</u>		3	3.33	3	4.28	0.986
<u>Re-infarction rate</u>		3	3.33	2	2.85	0.456
<u>NYHA IV Cardiac Insufficiency</u>		4	4.44	3	4.91	0.235
<u>Intrastent thrombosis</u>		2	2.22	1	1.42	< 0.001

Table 5. Three months end-points.

Parameters		Patients with Diabetes Mellitus		Patients without Diabetes Mellitus		P value
		N	%	N	%	
Telediastolic volume	> 155 ml	30	34.48	35	52.23	0.0256
	< 155 ml	57	65.51	32	47.76	< 0.001
Ejection fraction	> 55%	35	40.22	28	41.76	0.326
	40-55%	36	41.37	41	41.79	< 0.001
	35-40%	16	18.39	3	61.19	< 0.001
	< 35%	2	2.29	1	4.47	0.235
Mortality rate		1	1.14	2	1.49	0.415
Re-infarction rate		2	2.29	1	2.98	0.289
NYHA IV Cardiac Insufficiency		1	1.14	1	1.49	0.326
Intrastent thrombosis		1	1.14	1	1.49	0.458

PTCA. The risk of restenosis is significantly greater for diabetic than nondiabetic patients following PTCA.(4,5)

Mortality rate was greater in diabetic patients both at one month and at three months. The end-diastolic volume increased better in non-diabetic patients during the entire follow-up. The ejection fraction is improved both at one month and at three months, but more in non-diabetic patients.(6-9)

CONCLUSIONS

These findings are pleading for the use of an invasive strategy in patients with acute myocardial infarction presenting at more than 12 hours after symptom onset, with the mention that diabetic population have a poor prognosis and a higher rate of complications that the non-diabetic one.

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