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THE EFFECT OF 120 & 1000 MICROGRAM INTRACORONARY ADENOSINE ON NO REFLOW AND ST RESOLUTION IN STEMI PATIENTS

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ABSTRACT

Objective: To assess the clinical effectiveness and safety of intracoronary adenosine injection poststenting parameters such as no-reflow, slow flow and ST resolution after percutaneous coronary intervention (PCI).

Patients and method: Consecutive of 76 patients with a diagnosis of ST-segment elevation myocardial infarction (STEMI) enrolled in this clinical trial study. The patients were divided in to two groups with a simple randomization method. Intra-coronary (IC) bolus adenosine (120-1000 micogram in left coronary artery and 60-500 micogram in right coronary artery) (ICADN) was administered. Statistical analyses were performed with SPSS software for Windows. P values < 0.05 were considered as significant.

Results:We studied 76 patients (65 men and 11 women) with ST-segment elevation myocardial infarction (STEMI) candidate for PCI. The mean± SD age was 60.3 ± 12.21 years old (range 28-88 Y/O). According to our data shown in table 3.there was not significant difference between poststenting parameters such as slow-flow, no re-flow and ST resolution when high and low doses of adenosine were administered. Our results revealed administration of different doses of adenosine did not affect on poststenting outcome.

Conclusion:According to our results there was not significant difference between poststenting parameters such as slow-flow, no re-flow and ST resolution when high and low doses of adenosine were administered.

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Introduction

Primary percutaneous coronary intervention (PPCI) is the preferred treatment of ST segment elevation myocardial infarction (STEMI) [1].

No-reflow phenomenon is described as insufficient myocardial perfusion of the sufficiently dilated target vessel without evidence of angiographic mechanical obstaclation [2]. Occurrence of angiographic no reflow phenomenon has been accounted as high as 10% to 44% in acute myocardial infarction (AMI) patients undergoing PCI [3,4]. Reperfusion no-reflow is an independent indicator of short- and long-term unfavorable cardiac events and mortality following PCI [5]. Clinically no reflow may represent with the recurrence of chest pain, cardiogenic shock, malignant arrhythmias or acute dyspnea due to pulmonary edema secondary to heart failure. No reflow is a progressive event and its presentation may be deferred [6].

Early recognition, preventive measures and treatment of no reflow may modify the final outcome of PCI. As the process is multi-factorial, a variety of therapeutic strategies are required in special situations. Current pharmacological management

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entails the use of vasodilators, including nitrates, verapamil, papaverine, adenosine, nicardipine, and sodium nitroprusside, but as an interesting point, vasoconstrictors such as epinephrine may also have a role [7]. In this clinical trial study we investigated the effect of low dose and high dose intracoronary Adenosine on no reflow and ST resolution in STEMI patients undergoing primary PCI.

During nine months a consecutive of 76 patients with a diagnosis of ST-segment elevation myocardial infarction (STEMI) enrolled in this clinical trial study. Written, informed consent was attained from each patient.

Catheterization Procedure

After sterile preparation and injection of 2% lidocaine at the puncture site, an arterial sheath was used to enter the femoral artery. As a pre-treatment strategy, dual antiplatelet therapy with aspirin (300 mg loading dose and 75 mg/day maintenance) and clopiogrel (600 mg loading dose and 75 mg/day maintenance) were administered and given for up to 12 months

The patients were divided in to two groups with a simple randomization method. Intra-coronary (IC) bolus adenosine (120-1000 micogram in left coronary artery and 60-500 micogram in right coronary artery) (ICADN) was administered. Then the affect of different doses of intracoronary Adenosine on no reflow and ST resolution in STEMI patients undergoing primary PCI was investigated.

Electrocardiograms were recorded on arrival and 60 minutes after the angioplasty. ST resolution was calculated 60 minutes after PPCI at the equivalent lead with maximal ST elevation in pre-PCI electrocardiography.

Heart rate, aortic pressure, and distal coronary pressure were continuously recorded and digitally stored throughout all the phases of the study. Patient‟s symptoms (including angina-like sensation, dyspnea, or flushing), development of AVB, or any other complication were carefully recorded.

Statistical analysis

Data were assessed for normality, and statistical tests in conjunction with the presentation of results were chosen consequently. Continuous normally distributed data are presented as mean ± standard deviation and were analyzed with ANOVA followed by post hoc Bonferroni tests. Median values (min, max) are presented for data that were not normally distributed. Either the Mann-Whitney U-test or the Kruskal–Wallis test was used to compare two or more unrelated groups, respectively. Also, the Wilcoxon test was used to compare two related non-normally distributed variables. Spearman‟s test was performed to test for association. Categorical data are presented as frequencies.

Two-tailed tests of significance are reported and P values less than 0.05 were considered a priori to indicate statistical significance. Statistical analyses were performed using the SPSSstatistical software program (SPSS version 16.0.2, Chicago, IL).

Results

We studied 76 patients (65 men and 11 women) with ST-segment elevation myocardial infarction (STEMI) candidate for PCI. The mean± SD age was 60.3 ± 12.21 years old (range 28-88 y/o). Demographic characteristics of patients were represented in Table 1. Among patients underwent coronary angiography stenosis was detected as followed: left anterior descending in 41 patients (51.9%), left circumflex in 9 (11.8%) and right coronary artery in 26 (34.2) respectively.

In our study longer time to reperfusion was related with higher prevalence of no re-flow and slow flow which was shown in table 3. Prevalence of slow-flow in patients with reperfusion time more than 6 hours was considerably higher than patients with reperfusion time less than 2 hours (38.7% vs 11.1% , p=0.05).

ST resolution was correlated with the time to reperfusion. The longer time to reperfusion less prevalence of ST resolution (45% for >6 h vs 88% for <2 h, p=0.002).

According to our data shown in table 3.there was not significant difference between post-stenting parameters such as slow-flow, no re-flow and ST resolution when high and low doses of adenosine were administered. Our results revealed administration of different doses of adenosine did not affect on post-stenting outcome.

Table 1. Basic Characteristics of patients

Table 1. Baseline Characteristics	**(n=76)**
Age (years)	60.3 ± 12.21
Sex (Male/female)	(65/11)
Smoking (%)	37 (48.7%)
Diabetes (%)	22 (28.9%)
Hypertension (%)	43 (56.6%)
Family History of IHD (%)	31 (40.8%)
Dyslipidemia (%)	30 (39.5%)

Table 2. Affect of time to perfusion period on poststenting parameters.

	Time to reperfusion (hour)				P value
	<2	2-4	4-6	>6	
	(n=9)	(n=23)	(n=19)	(n=31)	
No reflow	0	0	0	3 (9.7%)	0.2
Slow flow	1 (11.1%)	4 (17.4%)	1 (7.7%)	12 (38.7%)	0.05
ST resolution	8 (88.9%)	21 (91.3%)	8 (61.5%)	14 (45.2%)	0.002

Table 3. Affect of high and low doses of adenosine on poststenting parameters.

		Slow flow N (%)	P value	No reflow N (%)	P value	ST resolution N (%)	P value
RCA	**Adenosine 60 µg**	4 (30.8)	0.61	1 (7.7)	0.32	10 (76.9)	0.69
	Adenosine 500 µg	3 (23.1)		0 (0)		11 (84.6)	
LAD & LCX	**Adenosine 120 µg**	6 (25)	0.62	1 (4.2)	0.95	15 (62.5)	0.71
	Adenosine 1000 µg	5 (19)		1 (3.8)		15 (57.7)	

Discussion

According to our results there was not significant difference between poststenting parameters such as slow-flow, no re-flow and ST resolution when high and low doses of adenosine were administered. Our results revealed administration of different doses of adenosine did not affect on poststenting outcome.

Coronary no-reflow that is ascribed to microcirculation dysfunction is the result of various factors (8). Since no-reflow may produce the fatal complications and a poor clinical outcome, it is critically imperative to put off and treat PCI-related complications and expand the efficacy and safety of the procedure. Current therapy of coronary no-reflow consists of vasodilators as well as antithrombotic or thrombolytic drugs (9-11). Adenosine is considered as a helpful drug for diminishing the incidence of no-reflonevertheless, it can enhance the risk of heart block, hypotension, and other unpleasant reactions. Furthermore, the half-life is moderately little, and thus the agent has to be administrated frequently.

Adenosine is a compelling vasodilator. It is thought to have further benefits as a result of its pleiotropic effects: the anti-inflammatory action of adenosine is well described (12,13). And its capacity to block the neutrophil-mediated processes that promote MVO may clarify the diminution of reperfusion injury seen with intracoronary (IC) adenosine in canine infarct models and lessens formation of oxygen free radicals. Adenosine has also been administered by intracoronary (IC) route in no reflow patients and found effective. The effects of adenosine on the coronary microcirculation during STEMI have only been evaluated using CMRI in one earlier study.

Desmet et al. (14) evaluated whether intracoronary administration of adenosine, distal to the occlusion site and immediately before initial balloon inflation, led to augmented myocardial salvage and reduced MVO versus placebo on CMR at 48 to 72 h post P-PCI in 112 patients. It is reported that reported a statistically considerable benefit in favor of adenosine in patients with Thrombolysis in Myocardial Infarction (TIMI) 2-3 flow pre-PCI. This recommended that establishing flow before adenosine delivery was valuable and perhaps essential for the drug to have a clinical effect.

Conclusion

According to our results there was not significant difference between poststenting parameters such as slow-flow, no re-flow and ST resolution when high and low doses of adenosine were administered. Our results revealed administration of different doses of adenosine did not affect on poststenting outcome.

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