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IMMEDIATE AND LONG-TERM RESULTS OF REPERFUSION THERAPY OF ACUTE CORONARY SYNDROME WITH ST-SEGMENT ELEVATION

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Abstract

The purpose of the study is to investigate the immediate and long-term results of thrombolytic therapy and transluminal coronary angioplasty of acute coronary syndrome with ST-segment elevation. Pre-hospital thrombolysis is an effective method of treating myocardial infarction patients with ST-elevation. Applying it leads to coronary reperfusion in 57.3 percent of cases according to the results of the first coronary angioplasty upon admission to hospital.

Transluminal coronary angioplasty with stenting implemented 90 minutes after the start of fibrinolysis regardless of its result allows to achieve the localization of a myocardial infarction in 100 percent of cases provided coronary blood flow along the coronary artery is optimal and is not accompanied by grave immediate and hospital complications. Low hospital (0 %) and long-term (up to one year) mortality (6.4%) and the small number of other complications of transcatheter revascularization, both in case of prepared transluminal coronary angioplasty and in case of salvage transluminal coronary angioplasty carried out within the same time limit, namely the first four hours since the development of pain syndrome, turned out to be compatible.

A 12-month observation after transcatheter revascularization testified to a low level of the reversion of cardiac angina (12.7%), which would require repeat revascularization. Early onset of thrombolytic therapy at the prehospital stage with subsequent coronary angioplasty in cases of acute myocardial infarction with ST-elevation regardless of the result of thrombolysis has a favorable immediate and long-term prognosis.

Keywords: Myocardial infarction, ST-segment Elevation, Thrombolysis, Stenting.

Introduction

High incidence of cardiovascular diseases as well as high level of disablement and premature mortality of the population as a result of acute ischemic heart disease (IHD) remain an important problem of cardiology and healthcare in most countries [1]. Up to 30 percent of patients discharged from the hospital after an episode of acute coronary syndrome (ACS) need repeat hospitalization within the first six months [2]. Hospital mortality of patients with myocardial infarction (MI) with ST-elevation is higher than of ACS patients without ST-segment elevation (7 % и 3-5% respectively). However, in six months mortality figures in the two specified conditions are comparable, namely 12% and 13% [3]. In the long term, mortality of ACS patients without ST-segment elevation exceeded that of ACS patients with ST-segment elevation. In particular it was twice as high in four years [4].

A pathogenic method of treating acute MI with ST-segment elevation is restoration of the coronary blood flow along occluded coronary arteries which can be achieved by prescribing thrombolytic therapy (TLT) and/or transluminal coronary angioplasty (TCA).

Each of these methods has its advantages and demerits. Thrombolysis is successful with 50-60 % of MI patients, but residual stenosis in damaged segment of coronary artery persists. During TCA, coronary reperfusion is achieved in more than 90 % of cases, whereas residual stenosis is decongested during an operation. The impacts of TLT and primary TCA on the disease in the first three hours of angina attack are identical [5].

Early and complete restoration of the lumen of the coronary artery which corresponds to MI localization with normalization of capillary blood flow is an adequate strategy of treating MI [6]. This effect can be achieved by means of combining fibrinolytic therapy with subsequent immediate TCA, regardless of the presence of coronary reperfusion.

Potential advantages of TCA include early reperfusion, a decrease in MI complications, a higher frequency of success, better coronary blood flow in TIMI and higher survivability[7]. In spite of the potential advantages of this method, the results of some clinical trials failed to show any advantages with regard to decrease in the area of MI or disease outcome [8].

In view of the conflicting data as regards the assessment of clinical efficiency of immediate and long-term results of MI patients, who underwent TLT after TCA, the examination of this issue appears relevant.

The objective of the research: to study immediate and long-term results of thrombolytic therapy and TCA of ACS with ST-segment elevation.

Materials and Methods

In total, 110 patients aged between 28 and 79 years were examined and treated. They were namely 82 males and 28 females with acute myocardial infarction with ST-segment elevation (STSE) on the EKG who were admitted to the heart center of Almaty (average age 54.7 ± 10.3 years). All the patients received thrombolytic therapy (at the prehospital stage) with subsequent hospital percutaneous transluminal coronary angioplasty and were divided into two groups according to electrocardiographic effects of features of efficiency of TLT:

Group 1 – 28 patients who showed signs of MI reperfusion after 90 minutes of TLT, which was embodied by more than 50% decrease of the STSE on the EKG.

Group 2 – 72 patients, who showed no convincing EKG signs of MI reperfusion after 90 minutes of TLT (their STSE persisted or was lowered less than 50%).

The main criterion for inclusion was the proven case of STSE in the first six hours from the onset of the disease. Additional criteria for inclusion were the absence of mental illness in past medical history; comorbidity in the phase of remission; the patient's signing of informed consent. The criterion of exclusion was the patients delivered later than 12 hours from the start of pain syndrome in the chest, who did not, accordingly, receive TLT at prehospital stage. Supervision of the patients lasted for one year, during which the development of "end points" (death, MI, emergency, acute cerebrovascular event, decompensation of chronic heart failure) was observed. The patients were invited for a revisit; if it was impossible, they were questioned on the phone.

In order to assess the severity of acute vasogenic shock in an acute period of MI we used the Killip classification (1967) and in subsequent periods, the New York Heart Association's (NYHA) functional classification. For evaluation of the functional class of angina, the Canadian Cardiovascular Society's grading system was used. When analyzing ventricular disruptions of rhythm, only Grade III and subsequent Grades of Lown's Grading of PVCs were taken into account.

The research protocol was approved by a local ethics committee of Asfendiyarov Kazakh National Medical University. Earlier, clinical signs of IHD were observed in 55.5 % of patients, arterial hypertension (AH) in 89.1 % of patients, family history of cardiovascular pathology in 16.4 % of patients. 39.1 percent were smokers, 19.1 had diabetes of type 2 in family history, 67.3 % had body weight index >25 kg/sq.m. 12.7% had dyslipidemia in family history, 9.1 % had acute cerebrovascular event (ACE), 32.7 % had creatinine clearance <60 mL/min, 8.2 % had earlier undertaken percutaneous coronary intervention (PCI) and 1.8 % had Coronary Artery Bypass Grafting (CABG).

Before MI developed, 7.3 % regularly took statins at the outpatient treatment stage, 15.5 % took aspirin, 28.2 % had β -adrenoblockers. 62.7 % of patients had anterior localization of MI; 37.3 had inferior localization. EF of the left ventricle $\leq 40\%$ was diagnosed in 21.8 % of patients. 90.0 percent of patients had diabetes of types 1 and 2 according to the Killip classification at admission. Sinus rhythm was recorded in 81.1 % of patients (Figure 1).

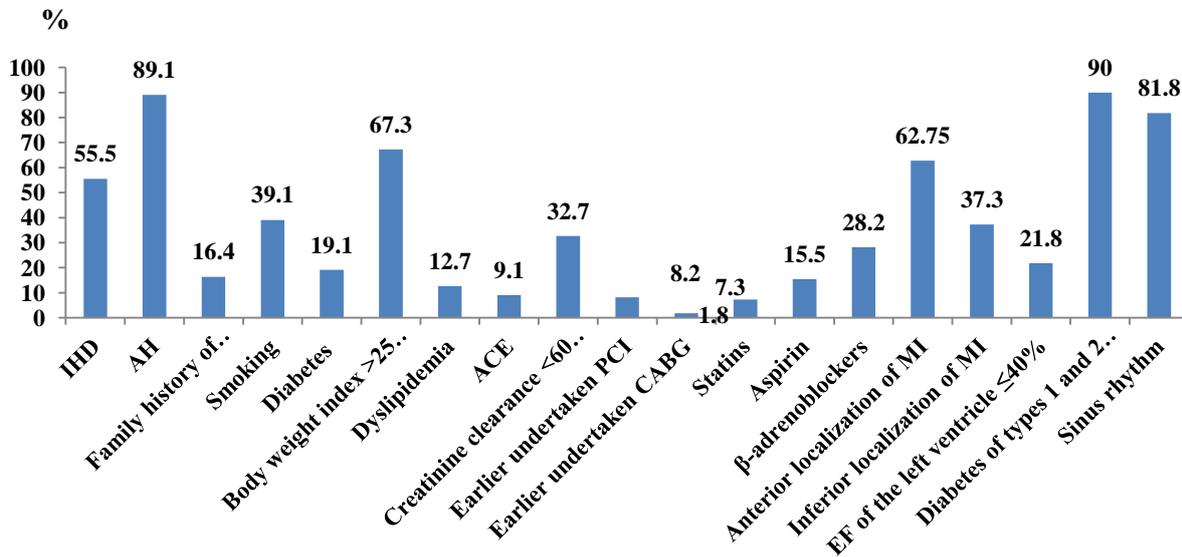


Figure 1. Anamnestic data.

All the patients had a general clinical examination with the confirmation of diagnosis and a decision on the therapeutic approach. The MI diagnosis with STSE on the EKG was made on the basis of clinical findings (typical pain syndrome lasting for at least 20 mins), EKG dynamics (in the shape of constant STSE ≥ 0.2 mV) in two contiguous precordial leads or ≥ 0.1 mV in at least two extremity leads or new left bundle-branch block) and changes in the specific ferments of myocardial necrosis according to the universal definition of MI amended in 2012 [6].

Pain management was implemented initially and subsequently with narcotic analgesics (morphine). Aspirin, clopidogrel, non-fractionated heparin (NFH), nitrates, β -adenoblockers, inhibitors of angiotension-converting enzyme (iACE), statins and other medications were applied in accordance with existent standards of providing assistance for MI patients.

Thrombolysis was undertaken by all the patients, since they did not have counter-indication. It was conducted as routine thrombolytic therapy (TLT) by ambulance crews at the prehospital stage. A fibrinolytic agent from the standard ambulance package was used, namely a tissue-type plasminogen activator Actilyse. Administration of the thrombolytic agent was started by an ambulance crew and continued in the in-patient facility in case of quick admission.

In treatment with Actilyse, a standard method of administration was applied. IV bolus injections were performed in 15-mg dose, after which an IV infusion of 50 mg within half an hour, then an infusion of 35 mg within one hour up to the dose of 100 mg. Patients weighing less than 65 kg received a dose proportionate to their weight. However, the dose never exceeded 1.5 mg/kg.

In assessing the initial (before the reperfusion) blood flow in the infarct-related coronary artery and the effect of medications or aggressive therapy, TIMI classification (scale) was used [9].

Diagnostic and control coronary angiographies (CAG) were carried out in a catheter laboratory. Before angiography was undertaken, we tried to carry out echocardiography with identification of the left ventricular ejection fraction.

Changes in the blood stream were observed in 11 segments: proximal, medium, and distal portions of the right coronary artery; left main of the coronary artery, proximal, medium and distal portions of the anterior descending artery; proximal, medium (in case of dominant left coronary artery) and distal portion of circumflex artery; the secondary branches of the artery. CAs were considered as having hemodynamically irrelevant stenosis in case their lumen was narrowed less than 50%. Changes in the CA lumen amounting to 30% in diameter were considered edge roughness.

In case of absence of visible changes, CAs were described as intact (angiographically unchanged).

TCA was carried out according to A.Gruentzig's method [11] immediately after diagnostic CAG. Patients with multi-vessel CAD who required a coronary artery bypass graft and mammary coronary bypass (CABG and MCB) only had TCA of the infarct-related artery (IRA). Coronary stenting was carried out after TCA. The criterion of success of the procedure was the removal of total occlusion or of hemodynamically relevant CA stenosis with the achievement of residual stenosis of less than 20% in diameter of the lumen vessel and TIMI flow of not less than grade 2 without complications during hospitalization. CAD was determined according to the Syntax score: moderate (<22 points), high (22-32 points) and severe (≥ 32 points).

The degree of reperfusion was assessed with the use of EKG in 12 leads. The "threshold" of the effectiveness of epicardial reperfusion was 70% lowering of the ST-segment in case of inferior lateral myocardial infarction and 50% lowering of the ST-segment in case of anterior infarction. In case such dynamics was not recorded by EKG, incomplete reperfusion or occlusion was assumed.

The analysis of results included data of initial hospitalization, as well as subsequent outpatient and hospital observations. According to the data of initial hospitalization, survival rate and the following phenomena were

calculated: cerebrovascular complications, recurrent myocardial infarction, a repeat TCA or a repeat coronary artery bypass surgery. Long-term results (up to 12 months from the development of MI) were subjected to analysis upon the onset of one of the phenomena or the termination of the observation period. Clinical results were assessed according to survival rate and frequency (%) of recurrent MI and angina linked to the IRA; coronary bypass surgery or repeat coronary angioplasty in the IRA. Angiographic findings were determined according to the frequency of restenosis (repeat narrowing of the artery in the bypass segment by 50% in diameter or more) and subsequent revascularization of the IRA.

Methods of statistical analysis. The results were processed with the help of software BioStat (S.Glanz, USA, 1999), Statistica for Windows 6.0 (StatSoft Inc., CIHA 2001), Data Analysis Toolpak of Excel 2003 (Microsoft, USA, 2003). Character of the sample distribution was determined.

The indices that had strong right-skewed distribution were analyzed according to a logarithmic scale. Representativeness of obtained results was evaluated for every type of analysis. Values of $p < 0.05$ were considered statistically significant. The Tables and Figures all present group values as mean Standard Deviations. In case of normal distribution, for initial comparison of data between groups we used one-way analysis of variance with the application of Student's t-test in case of detection of significant differences. The indices' dynamics were assessed by repeated measures analysis of variance.

Results and Discussion

Upon admission to hospital, complaints of chest pain persisted in spite of therapy with 88 patients (69 in Group 2 and 19 in Group 1). In 22 cases prehospital therapy with narcotic analgesics was quite effective and patients suffered no pain (11 patients in Group 2 and 11 patients in Group 1).

Localization of MI according to EKG is described in Table 1.

Table 1. Localization of MI in the patients.

Localization of MI	Group 1 (n=28), %	Group2 (n=82), %	p
Anterior	57.3	68.2	>0.05
Including lateral	4.5	10	>0.05
Including septal	6.4	10	>0.05
Inferior	42.7	31.8	>0.05
Including posterior	2.7	1.8	>0.05

p – Statistical significance of the difference between indices of Groups 1 and 2.

The study revealed that anterior MI prevailed in both groups (57.3 % in Group 1 and 68.2% in Group 2). Anterior lateral and septal MIs were relatively infrequent in both groups (from 4.5% to 6.4% in Group 1, and 10% each in Group 1). Inferior MI was observed significantly less frequently than anterior MI in both groups (31.8 % in group 2 and 42.7% in Group 1). Because of the small number of people in the subgroups, group differences in MI localization did not achieve the threshold of significance ($p>0.05$).

Biochemical and clinical analysis of the blood drawn upon admission showed no significant group differences with the exception of higher creatine-phosphokinase-MB in Group 2.

It is interesting to note that less than 120 minutes passed between the first medical contact and balloon dilatation of most patients in both groups, i.e. a significant part of patients in both groups were treated in accordance with the standards of care delivery to MI patients in the first two hours.

Diagnostic catheterization of CAs in both groups which preceded TCA, part of the patients (38% to 82% depending on group) showed normal (TIMI grade 3) or relatively lower (TIMI grade 2) antegrade blood flow (in 51 of 90 patients, which is 57%), whereas the remaining 39 patients (from 18% to 62 % depending on group) showed no significant antegrade blood flow in the IRA (TIMI grade 0-1).

Thus, in investigating the frequency of restoring coronary blood flow directly during CAG, it turned out that the group without electrocardiographic signs of reperfusion (Group 2) showed its frequency at 38 % before the start of TCA.

When the frequencies of normal or insignificantly lower initial antegrade blood flows of TIMI grades 2 and 3 of the groups of prepared TCA and salvage TCA were compared, a significant difference was revealed. Group 1 showed initial blood flow of TIMI grades 2 and 3 significantly more frequently (81.8%) than Group 2 (38.2%, $p<0.001$).

When the times of the start of TLT and of visualization of the blood flow in IRA were compared, no link was established between the interval of TLT catheterization and TIMI grade.

However, when the interval from the first medical contact and the balloon dilatation was examined, as divided according to the grade of the initial blood flow (TIMI), we recorded an insignificant reduction of time from balloon dilatation (from 118 to 116 minutes) in the background of an initially worse blood flow (TIMI grades 0-1).

Most patients in both groups had initial hypercholesteremia. The initially established blood lipids (Table 2) showed an increase in total cholesterol in two-thirds of the patients in Group 2 and in more than half of the patients in Group 1.

LDLs were considerably higher than the target level in all the patients regardless of the group. Patients of Group 2 showed pronounced discrepancies of triglyceride indicators whereas the average values of these indicators diverged most in both groups, without affecting significantly the group differences.

Table 2. Blood lipids of the patients.

Indicators of blood lipids	Group 1 (n=28), (M±m)	2-я группа (n=72), (M±m)	p
Total cholesterol	5.44±1.15	5.85±1.56	>0.05
Triglycerides	1.95±1.68	2.31±2.43	>0.05
LDLs	3.01±0.97	3.16±1.06	>0.05
LDLs	1.18±0.47	1.14±0.30	>0.05

p – Statistical significance of the difference between indices of Groups 1 and 2.

In diagnostic coronography, which preceded TCA and stenting, the patients had CAD in one or more CAs, which are listed in Table 3.

Table 3. CAD of examined patients.

Number of hemodynamically relevant CAD	Group 1 (n=28)	Group 2 (n=82)	p
Single-vessel disease	14	56	>0.05
Two-vessel disease	11	15	>0.05
Three-vessel disease	3	11	>0.05

p – Statistical significance of the difference between indices of Groups 1 and 2.

Analysis of the portions of arteries damaged as a result of MI showed that more than half of the damages in every group were concentrated in the anterior descending artery (ADA). Most of the TCA was carried out on the proximal segments of the anterior, circumflex, or right artery of Group 1 (44 of 82) whereas a large part the TCA was in medium and distal segments of the arteries (18 of 28). These differences between groups turned out to be significant (p=0.019). In all the cases, according to recommendations on the revascularization in case of MI, we tried to intervene (TCA with implantation of one or several stents) restricting ourselves to only infarction-related vessel and segment. We made exceptions for cases of complications during TCA when additional stent implants were necessary for removing significant dissections of dilated vessel in contiguous segments (extremely rare in the present study).

In all the cases TCAs in both groups were concluded by stent implantation, in the first place with a view to achieving the optimal lumen of the artery. In total, 71 stents were implanted in 52 damaged segments in Group 2 (1.37 ± 0.63 stents per patient), and 56 stents were implanted in 38 segments in Group 1. More than one stent were implanted in 47.3% of cases in Group 2 and 38.2% of cases in Group 1 (Figure 2). An insignificant increase in the frequency of multiple stenting in the group of prepared TCA did not significantly affect the number of implants in the artery.

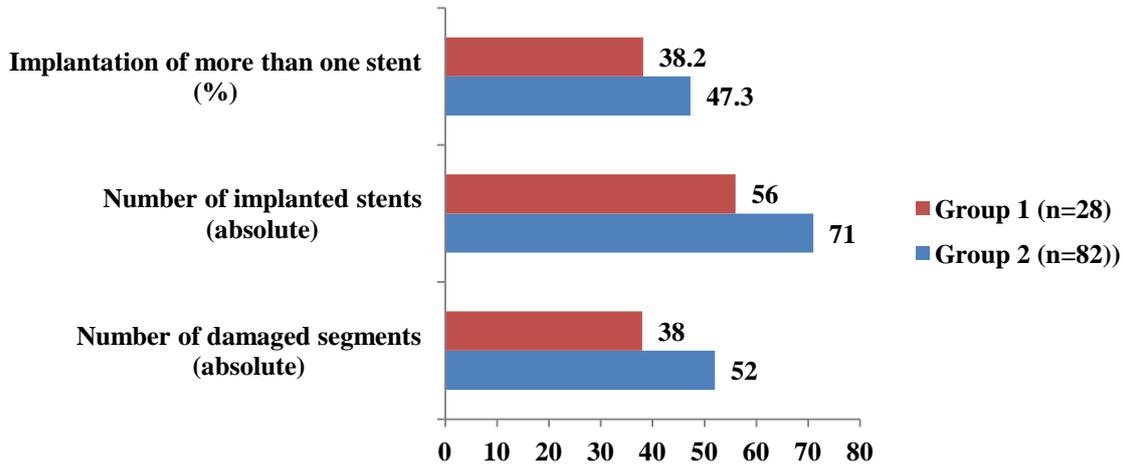


Figure 2. Data of transluminal coronary angioplasty of ACS with STSE.

In the course of PCI, drug-eluting stents (DES) were implanted in 79 patients, and bare-metal stents (BMS) were implanted in 19 patients, whereas 12 patients got both types of stents at the same time.

Pharmacological support during TCA with stenting and immediately before it was the following:

- Loading dose of acetylsalicylic acid (aspirin) (325-500 mg) was given to all the patients in both groups;
- Loading dose of Clopidogrel (taking into account the prehospital dose of 300 mg) was 600 mg with 108 of 110 patients, whereas it was limited to 300 mg for two patients in Group 2 because of age;
- Low molecular weight heparin (LMWH) enoxaparin was applied with 39 patients of Group 2 and with 19 patients of Group 1. All the other 43 patients of Group 2 and nine patients of Group 1 were given non-fractionated heparin (NFH);
- Glycoprotein receptor blocker tirofiban was applied with 36 patients of Group 1 and 10 patients of Group 2. Its dose also depended on the weight of a patient and had no group differences and was applied with an intravenous bolus in the dose of $10 \mu\text{g/ml}$ before PCI with subsequent intravenous injection in the dose of $0.15 \mu\text{g/ml}$ over 16-24 hrs after intervention.

During the mechanic recanalization of thrombotic occlusion with a wire guide, TCA and implantation of stents, three patients of Group 1 and one patient of Group 2 showed significant areocardia, which required administration of

atropine. This normalized the heart rate. One patient of Group 1 had high blood pressure, which necessitated relevant treatment. In spite of the prehospital application of narcotic analgesics in order to manage pain in six patients of Group 1 and in one patient of Group 2 during intervention, the pain syndrome recurred, which required administration of an extra dose of morphine. However, this adjuvant therapy had no group differences and did not tell significantly on the TCA result.

TCA with stent implantation was completed successfully on all the patients; immediate success was 100% and residual stenosis in the segment of stent implantation was approximately 20%, i.e. angiographic results of TCA in all the 110 patients were recognized as optimal.

In the first 24 hours after TCA one patient of Group 1 had a recurrent pain syndrome. The patient was delivered to the catheter X-ray operating room, where control angiography revealed an acute thrombosis of the stent. The patient had repeat TCA with implantation of another stent in the background of tirofiban administration. TCA was completed successfully, the patient was transferred to ICU and subsequent treatment of his myocardial infarction was non-relapsive. The remaining 109 patients had no relapse of the primary condition at hospital.

An EKG-trace during exercise showed that in spite of the quick and effective reperfusion, most patients had a Q wave. Nevertheless significant differences were detected between groups in the frequency of development of transmural MI after TCA: transmural MI with a Q wave on EKG was recorded after ineffective thrombolysis in 81 of 82 patients in Group 2, which made up 98.8 %. At the same time, Group 1, which had signs of reperfusion before the start of TCA and 82.1% of patients had adequate antegrade blood flow (TIMI grades 2 and 3), transmural MI with a Q wave on EKG was recorded in 22 of 28 patients which made up 78.6 %. These differences turned out to be significant ($p=0.004$), which speaks in favor of prepared TCA. According to the data of control echocardiography, no significant differences between the two groups were detected. The difference of 2.7% in the value of EF of the left ventricle in favor of the group with prepared TCA did not achieve the threshold of statistical significance.

From the first day of illness the patients were given β -adrenoblockers, ATE inhibitors, statins and, where appropriate, diuretics and proton pump inhibitors. The doses of medication affecting hemodynamics were titrated according to arterial tension and the heart rate. After the loading dose on the first day, all the patients got an aspirin dose of 75-100 g after the second day of illness, whereas Clopidogrel was prescribed in the dose of 150 mg/day at hospital, also after the loading dose. All the patients had loading tests (bicycle exercise, treadmill), if appropriate, before release.

At discharge all the patients were advised to take aspirin in a dose of 75-100 mg per day permanently, Clopidogrel in a dose of 75 mg per day for one year from the onset of the disease, β -adrenoblockers and statins permanently.

One patient of Group 2 had a successful repeat TCA seven days later because of a sub-acute stent thrombosis (one day after discharge from the hospital).

In total, over 12 months of subsequent observation, seven (or 6.3% of) patients died. The cause of death was ascertained as cardiovascular in four patients, and it was impossible to establish it with three other patients. 12.7 percent of patients had angina, which coronary angiography revealed to be caused by IRA restenosis and they were successfully treated by repeat PCI (13 patients) or coronary bypass surgery. All the interventions were successful. 80 % of patients had no relapse.

Over one year of observation, 14 patients had clinical and angiographic signs of restenosis, namely positive loading tests, recurrent angina and stenosis of over 50 % of the IRA lumen. Thus, the level of restenosis as a whole was 12.7 % (14 of 110 patients).

Prehospital thrombolysis is an efficient method of treatment in MI patients with STSE. Its use leads to coronary reperfusion in 57.3 % of cases according to the result of the first CAG carried out upon hospital admission.

Transluminal coronary angioplasty with stenting carried out 90 minutes after the start of fibrinolysis regardless of its result achieves optimal coronary blood flow along the coronary artery in 100 % of cases. This artery corresponds to MI localization and is not accompanied by immediate or hospital complications.

Low hospital (0%) and of long-term, namely one-year-off, mortality in 6.4 % of cases and the small number of other PCI complications both in case of prepared TCA and in case of salvage TCA carried out in the same time period, i.e. the first four hours from the development of the pain syndrome, were compatible. The data of 12-month observation after PCI also showed low levels of angina recurrence (12.7 %) and repeat revascularization.

Thus, early start of thrombolytic therapy at the prehospital stage with subsequent coronary angioplasty in case of acute myocardial infarction with STSE regardless of the result of thrombolysis is accompanied by good immediate and delayed action.

Conclusions

The study is based on the results of a 12-month prospective observation of 110 patients after coronary revascularization as a result of acute myocardial infarction. The observation was conducted in two groups depending

on the success of thrombolytic therapy with Actilyse, presence (n=28) or absence (n=72) of signs of reperfusion embodied by a more-than-50% decrease in the STSE within 90 minutes after thrombolysis.

As a result of the conducted research we established that

1. During the development of a large-focal myocardial or transmural infarction, the anterior descending coronary artery was damaged most often, with the development of the anterior (57.3% in Group 1 and 68.2% in Group 2), and less frequently, of the septal and lateral myocardial infarction. The circumflex artery was damaged statistically less often when inferior myocardial infarction was developed (42.7 and 31.8%), $p < 0.05$.
2. Following prehospital thrombolytic therapy and during coronography the frequency of blood flow recovery with presence of antegrade flow was 82.0% in Group 1 and 38.0% in Group 2. The obtained data were compatible with EKG results 90 minutes after thrombolysis.
3. When diagnostic catheterization of CAs which preceded transcatheter angioplasty was conducted in both groups, Group 1 showed antegrade blood flow of TIMI grades 2 and 3 significantly more often than Group 2, where no significant antegrade blood flow along the IRA was observed (TIMI 0-1), $p < 0.001$.
4. In view of the localization and morphology of damages, the greater half of the procedures of transcatheter angioplasty were applied in proximal segments of the anterior, circumflex, or right coronary arteries in Group 1, whereas the greater half of procedures of transcatheter angioplasty in Group 2 were in medium and distal segments of coronary arteries. The specified differences between groups were statistically significant ($p = 0.019$).
5. We detected significant differences between groups as regards the frequency of development of transmural infarction after the procedure of transcatheter angioplasty. Specifically, transmural MI was diagnosed in 98.8% of the patients in Group 2 (81 of 82 patients) following ineffective thrombolysis. In the meantime, transmural MI was developed in 22 of 28 patients (78.6%) of Group 1 by the start of transcatheter angioplasty in the background of EKG signs of reperfusion. This fact testifies to the statistically significant use of prepared transcatheter angioplasty ($p = 0.004$).
6. Angiographic success of transcatheter angioplasty with stent implantation in both groups was 100%, which was verified by control angiography of 110 patients. Residual stenosis in stenting CAs was less than 20.0 %.
7. The frequency of early complications was 0.9 % and noted for pain syndrome in the background of acute stent thrombosis verified by control angiography. When complications arose, a repeat transcatheter angioplasty was carried out, with repeat stent implantation in the background of tirofiban administration.

8. Seven patients, or 6.3% of the general number, died within the 12 months of subsequent observation. Four of them, or 3.6 %, died of cardiac failure. Three patients, or 2.7 %, had non-cardial causes of death.
9. Over one year of prospective observation 14 patients had clinical and angiographic signs of restenosis, confirmed by positive loading tests, emergence of clinical signs of recurrent angina, angiographic stenosis of more than 50 % of the stent lumen. Thus, the frequency of restenosis was at the level of 12.7 %. All the cases of restenosis were successfully treated by repeat transcatheter coronary intervention (13 patients or 92.9 %) or CABG surgery (one patient or 7.1%). All the re-interventions were angiographically, clinically and procedurally successful.
10. Prehospital thrombolysis is an efficient method of treating MI patients with STSE. Its use leads to sufficient coronary reperfusion in most patients according to control coronary angiography carried out immediately after hospital admission. Thus, early start of thrombolytic therapy at prehospital stage with subsequent coronary angioplasty in case of acute myocardial infarction with STSE regardless of the result of thrombolysis is attended by a good forecast for the immediate and long-term future.
11. Transluminal coronary angioplasty with stenting which is carried out 90 minutes after the start of fibrinolysis regardless of its result allows to achieve 100% optimal coronary blood flow along the coronary artery in accordance with MI localization and is not attended by serious immediate or hospital complications.
12. Low hospital (0%) and long-term, i.e. up to one year off (6.3%) mortality, the small number of complications of transcatheter revascularization both in case of planned TCA and salvage TCA carried out in the same time period, i.e. in the first four hours after the development of pain syndrome, testifies to high clinical effectiveness of this method in cases of MI patients.

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