Original article

Comparison of primary balloon angioplasty with *bailout* stenting strategy to primary coronary stenting strategy in the treatment of patients with ST-segment elevation myocardial infarction (STEMI)

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Abstract

Background: In recent years significant progress has been made in invasive treatment of patients with acute myocardial infarction (AMI). Primary coronary stenting is currently a routine strategy which replaced primary balloon angioplasty with bailout stenting preferred in the past. Studies comparing these two strategies of stenting in AMI are scarce.

Aim: To compare the immediate and long-term outcomes after primary angioplasty strategy and *bailout* stenting versus primary stent placement strategy in patients with AMI.

Methods: We analysed data from a single-centre registry of consecutive patients with ST segment elevation myocardial infarction admitted between January 1998 and October 2003. In our centre in years 1998-2000 stenting was used only after failed or suboptimal balloon angioplasty. Starting from year 2001 we used routine primary stenting strategy. We compared these two angioplasty strategies applied in different time intervals with regard to in-hospital outcome and long-term mortality. Patients with cardiogenic shock at admission were excluded.

Results: Out of a total of 1602 patients treated invasively for AMI (cardiogenic shock excluded) 479 underwent primary balloon angioplasty strategy with *bailout* stenting – group 1 (years 1998-2000) and 1123 were treated with primary stenting strategy – group 2 (years 2001-2003). In group 1 *bailout* stenting occurred in 34.4% of patients whereas in group 2 stents were implanted in 83% of patients. Patients in the balloon angioplasty group were younger, had shorter time from the onset of symptom to hospital arrival and more frequently underwent rescue coronary intervention after failed thrombolysis. In-hospital mortality was 2.9 vs. 2.4% in groups 1 and 2, respectively (p=NS). Twenty-four month mortality rate was 9.8% in group 1 and 10.06% in group 2 (p=NS).

Conclusions: 1. Effectiveness of coronary angioplasty is high and comparable in both groups. 2. In-hospital and long-term mortality and procedure-related complication rate are all low and comparable with both stenting strategies. 3. Independent factors increasing long-term mortality include: culprit vessel reocclusion, multivessel coronary disease, older age and hypertension. 4. Patients with complete patency of culprit vessel restored and with higher left ventricular ejection fraction presented lower 2-year mortality rate. 5. *Bailout* stenting did not increase 2-year mortality.

Key words: myocardial infarction, coronary angioplasty, *bailout* stenting

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Introduction

In recent years, enormous progress in invasive treatment of myocardial infarction (MI) has been observed. Previously, the method of choice was balloon coronary angioplasty followed, only if absolutely necessary, by rescue stent application – *bailout* stenting. Today, the procedure of routine stent implantation is recommended by European Cardiac Society 2005 Guidelines (class I recommendation, level of evidence A) [1]. There are no published studies comparing these two strategies of MI treatment. As we managed to collect clinical data on patients with MI treated invasively prior to the era of routine stent application, we were able to perform an analysis comparing individuals treated with balloon angioplasty completed by stent

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deployment, only in selected cases of procedural complications or suboptimal angiographic results, to those treated routinely with stents. In-hospital outcomes and follow-up long-term mortality were evaluated.

Methods

Study patients

Our analysis involved 1992 consecutive patients with ST-segment elevation MI (STEMI) treated in a single centre between January 1998 and October 2003.

Examined groups consisted of:

1) patients with persistent chest pain lasting ≥30 minutes,
2) with evolving signs of MI in ECG, such as ST-segment elevation by ≥0.1 mV in 2 or more limb leads or ≥0.2 mV in 2 or more precordial leads or new left bundle branch block,
3) with chest pain lasting no longer than 6 hours up to year 1999 and no longer than 12 hours since year 2000.

The following patients were excluded from further analysis:

1) with clinical (relief of pain) and ECG (resolution of ST-segment elevation by ≥50% of baseline values) signs of reperfusion before planned intervention,
2) with symptom duration over 12 hours without any evidence of haemodynamic instability,
3) presenting contraindications to invasive therapy,
4) found in cardiogenic shock,
5) and those refusing coronary angiography.

After coronary angiography was performed, additional patients were excluded from the study if:

1) the infarct-related artery (IRA) was not identified and
2) adequate flow in IRA – TIMI 3 (Thrombolysis in Myocardial Infarction) accompanied by the absence of stenosis >50% of vessel diameter were noted.

All patients expressed informed written consent to the proposed therapeutic method.

Pharmacotherapy

All patients selected for angiography received (if not prior to hospital admission) 300-500 mg of acetylsalicylic acid (ASA), unfractionated heparin 5000-10000 units intravenously, 2.5-5.0 mg of morphine and other medications if indicated. Abciximab was not used routinely. Its administration depended on the physician's decision and drug availability at a given time.

Invasive treatment

Before year 2000 'rescue' intracoronary stent implantation was used when:

1) residual stenosis was >50% after balloon angioplasty,
2) dissection obstructing flow in the coronary artery occurred,
3) artery reocclusion occurred during angioplasty procedure.

Since 2001, stent implantation has become routine management in each case with suitable lesions. Following stent implantation, ticlopidine was administered 250 mg twice daily per 4 to 8 weeks but after introduction of clopidogrel in October 2001 into routine clinical practice all patients received a loading dose of 300 mg clopidogrel in the catheterisation laboratory, then 75 mg of clopidogrel once daily or ticlopidine 250 mg twice daily per 4 to 8 weeks.

Examined subgroups of patients

According to study design, patients who underwent coronary angioplasty were split into 2 groups: group 1 (n=479) – patients admitted to hospital in the years 1998-2000 who underwent balloon coronary angioplasty but stent implantation was performed just as a 'rescue' procedure (*bailout* stenting), and group 2 (n=1123) – patients hospitalised in the years 2001-2003 who underwent routine stent implantation, whenever feasible, irrespectively of balloon angioplasty result.

Long-term follow-up

Late death within 24-month follow-up was defined as death of any cause in the time period from admission to hospital to two years after MI symptoms onset. Information regarding survival or death was obtained by phone contact, written correspondence or medical charts stored in the Cardiac Outpatient Clinic. Simultaneously, information regarding patients who lived within the region was obtained from a regional branch of the National Health Fund.

Statistical analysis

Comparative analysis of groups involved parameters such as basic clinical characteristics, in-hospital outcomes, angiographic results and mortality during long-term 24-month follow-up.

Continuous variables of confirmed normal distribution were expressed as mean ± SD. Differences between means of the normally distributed and continuous parameters were tested by means of Student's t-test. Qualitative parameters were compared using χ^2 test (in the case of small groups Yates' correction was applied). Factors with an impact on long-term mortality were evaluated by means of multivariate regression of proportional Cox hazard method and the findings were presented as relative risk and 95% confidence interval (CI). A value of p (two-sided) <0.05 was considered significant. In the case of p >0.05 the result was defined as NS (not significant). Statistical analysis was performed using statistical software Statistica PL version 6.1 (StatSoft Inc.).

Results

The analysed group was selected from 1992 consecutive patients with STEMI. According to the study protocol, 175 patients found in cardiogenic shock on admission were excluded from the study. After initial evaluation, 1769 subjects were selected for coronary

Table I. Clinical characteristics of the study population

Parameter	Group 1	Group 2	p
Age (mean) [years]	55.7	58.1	<0.001
Male gender	362 (75.5%)	826(73.5%)	NS
Chest pain duration (mean) [hours]	4.25	5.01	<0.001
Upstream thrombolysis	219 (45.7%)	270 (24%)	<0.001
Anterior myocardial infarction	194 (40.5%)	456 (40.6%)	NS
Risk factors			
hypertension	241 (50.3%)	609 (54.2%)	NS
type 2 diabetes mellitus	104 (21.7%)	201 (17.9%)	NS
hypercholesterolaemia of >200 mg/dl (5.2 mmol/l)	309 (65%)	735 (65.5%)	NS
smoking	322 (67.3%)	729 (65.5%)	NS
history of myocardial infarction	98 (20.4%)	199 (17.7%)	NS

Table II. Angiographic parameters in the study population

Parameter	Group 1	Group 2	p
TIMI flow at baseline			
2 or 3	183 (38.2%)	345 (30.7%)	0.003
Final TIMI flow			
0 or 1 or 2	32 (6.7%)	188 (6.9%)	NS
3	447 (93.3%)	1035 (93.1%)	NS
Multi-vessel coronary artery disease	258 (53.8%)	565 (50.4%)	NS
Intracoronary stent implantation	165 (34.4%)	932 (83%)	<0.001
Number of vessels with significant stenosis			
1	221 (46.2%)	547 (48.8%)	
2	173 (36.1%)	374 (33.4%)	NS
3	82 (17.1%)	181 (16.2%)	

angiography while 48 presenting clinical and ECG signs of reperfusion underwent medical treatment. In 167 patients, in whom coronary angiography revealed TIMI 3 flow and/or stenosis was <50%, medical treatment was also chosen.

Thus, coronary angioplasty was performed in 1602 patients who constituted the target study group in our analysis. Basic clinical characteristics of the patients are presented in Table I. In group 1, patients were younger, had shorter duration of pain and more often received thrombolysis prior to hospital admission.

Angiographic parameters included in the comparison of both groups are outlined in Table II. The majority of them showed no differences between groups except for significantly higher rate of TIMI 2 or 3 flow at baseline in group 1 and more frequent use of stents in group 2.

Analysis of in-hospital data is shown in Table III. There were no differences between the two groups with respect to maximal creatine kinase level, left ventricular ejection fraction (LVEF), need for surgical revascularisation, incidence of stroke as well as haematomas requiring or not requiring blood transfusions. Reocclusion of IRA was observed significantly more often in group 1. Gastrointestinal bleeding complications were significantly more frequent in the group of routine stenting than in patients who underwent bailout stenting. Group 1 patients required longer hospitalisation than in group 2 and glycoprotein IIb/IIIa inhibitors were also used more frequently in group 2.

In-hospital mortality was similar in both groups (Table III). No statistically significant difference in 24-month follow-up mortality were observed between the subgroups (9.8 vs. 10.06%; p=0.8). Cumulative survival of both groups of patients was presented as a Kaplan-Meier curve (Figure 1).

Risk of death in 24-month follow-up is outlined in Table IV and presented in Figure 2. The independent risk factors associated with significantly increased risk of death derived by means of Cox's regression equation were: coronary artery reocclusion, multi-vessel coronary artery disease, arterial hypertension and older age. Factors that were associated with decreased risk of death in 24-month follow-up were: final TIMI 3 blood flow and higher LVEF. It should be highlighted that *bailout* stenting was not found to be an independent risk factor of increased mortality in the long-term follow-up.

Table III. Data on in-hospital course of the examined patient groups

Parameter	Group 1	Group 2	p
Maximum CK activity (mean) [U/l]	2470	2402	NS
LVEF (mean) [%]	44.9	45.3	NS
Reocclusion	38 (7.9%)	34 (3.0%)	<0.001
Need for CABG	24 (5.0%)	48 (4.3%)	NS
Complications			
stroke	3 (0.6%)	21 (1.9%)	NS
gastrointestinal bleeding	1 (0.2%)	14 (1.3%)	0.04
haematoma requiring blood transfusion	10 (2.1%)	20 (1.8%)	NS
haematoma without a need for transfusion	22 (4.6%)	41 (3.7%)	NS
Hospitalisation time (mean) [days]	10.4	8.2	<0.001
In-hospital mortality	14 (2.9%)	27 (2.4%)	NS
Use of IIb/IIIa inhibitors	2 (0.4%)	51 (4.5%)	<0.001

Abbreviations: CK – creatine kinase level, LVEF – left ventricular ejection fraction, CABG – coronary artery bypass grafting

Table IV. Risk of death during a 24-month follow-up in the whole study population

Parameter	Relative risk (95% CI)	p
Age (on 1 year more)	1.02 (1.01-1.04)	0.0067
Female gender	1.15 (0.80-1.65)	NS
Anterior wall infarction	1.36 (0.8-1.65)	NS
Thrombolysis prior to PCI	0.93 (0.64-1.36)	NS
Multi-vessel coronary artery disease	1.96 (1.36-2.83)	<0.001
Baseline TIMI 2 or 3 flow	0.70 (0.48-1.04)	0.076
Abciximab	1.37 (0.62-3.02)	NS
Final TIMI 3	0.5 (0.32-0.77)	0.0017
Reocclusion	2.19 (1.28-3.74)	0.0042
LVEF (by 1% higher)	0.94 (0.92-0.96)	<0.001
Smoking	1.13 (0.80-1.6)	NS
Hypertension	1.50 (1.07-2.11)	0.019
Diabetes mellitus	1.40 (0.98-1.99)	NS
Cholesterol level	0.88 (0.64-1.22)	NS
CABG during hospitalisation	0.78 (0.37-1.62)	NS
Pain duration (each 1 hour more)	1.03 (1.0-1.06)	0.055
History of myocardial infarction	0.98 (0.67-1.43)	NS
Group of routine stenting	0.95 (0.66-1.38)	NS

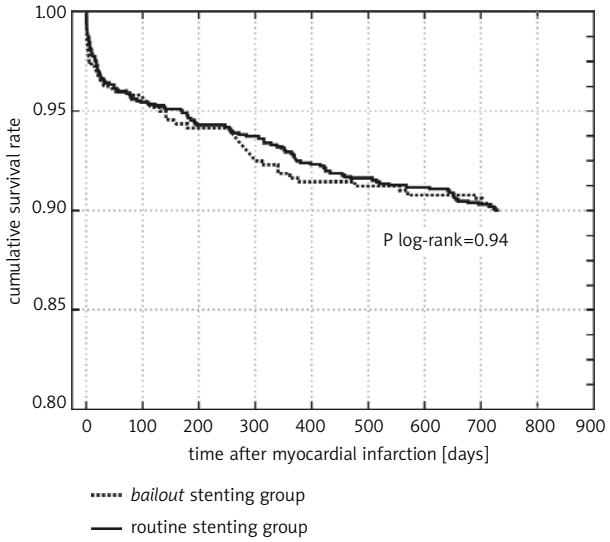

Figure 1. Cumulative survival rate (Kaplan-Meier method)

Because of shorter duration of pain prior to the procedure in group 1, we decided to analyse only patients (of both groups) with duration of chest pain not exceeding 6 hours (Table V). In-hospital and late outcomes in such subanalysis were similar to the results of analysis that comprised all study participants.

Discussion

Use of coronary stents in the first years after their introduction into clinical use in 1987 by Sigwart [2] was limited only to the treatment of balloon angioplasty complications (*bailout* stenting). Their safety and efficacy was proved in such clinical settings as well as in patients with stable coronary artery disease [3, 4]. At first they were not applied to the treatment of MI patients. A high-thrombogenic metal element implanted into the site of thrombus formation was thought to significantly increase the risk of acute or subacute in-stent thrombosis and in consequence diminish the efficacy of this therapeutic option. Finally, the introduction of double antiplatelet therapy (ASA plus thienopyridine) replacing anticoagulation significantly reduced the risk of in-stent thrombosis, haemorrhagic complications and prevalence of repeat MI by 82% [5, 6].

At that time, efficacy and safety of *bailout* stenting in MI were documented by a few clinical reports. They

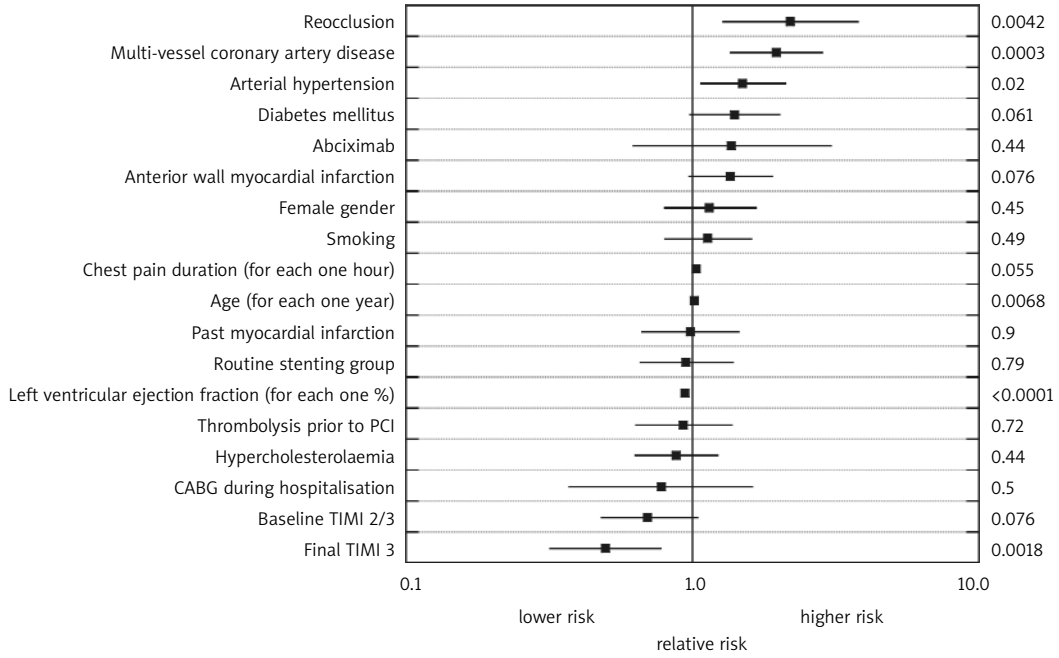

Figure 2. Factors affecting 24-month survival. The relative risk and 95% confidence interval are presented

Table V. Comparison of analysed parameters in relation to in-hospital course and late mortality in the examined patients with chest pain duration less than 6 hours

Parameter	Group 1	Group 2	p
Maximum CK activity (U/L, mean)	2419	2367	NS
LVEF (%, mean)	45.2	45.9	NS
Reocclusion	34 (7.2%)	26 (2.9%)	<0.001
Need for CABG	24 (1.5%)	48 (1.9%)	NS
Complications			
stroke	3 (0.6%)	12 (1.3%)	NS
gastrointestinal bleeding	0 (0%)	10 (1.1%)	0.02
haematoma requiring blood transfusion	9 (1.9%)	14 (1.6%)	NS
haematoma without a need for transfusion	20 (4.2%)	28 (3.1%)	NS
Hospitalisation time (days, mean)	10.2	8.2	<0.001
In-hospital mortality	12 (2.5%)	14 (1.6%)	NS
Use of IIb/IIIa inhibitors	0 (0%)	15 (1.7%)	<0.001
Mortality during 24-month follow-up	38 (8.0%)	94(10.4%)	NS

Abbreviations: see Table III

were mostly non-randomised and retrospective analyses. The rate of death in these studies ranged from 0 to 12.5%, repeat MI was noted in 0 to 8% of patients, and repeat percutaneous revascularisation in 0 to 26% [7-10].

In the late 1990s, the first randomised trials involving patients with MI were published. Balloon angioplasty alone was compared with percutaneous coronary intervention (PCI) with coronary stent implantation. The findings of these studies revealed advantages of stenting over classic angioplasty. Nowadays, the results of stent implantation are still not satisfactory although their introduction has improved outcomes of invasive treatment of patients with MI. It is associated with acute and subacute in-stent thrombosis, restenosis and related recurrent ischaemia as well as a need for repeat revascularisation. Moreover, distal embolisation of microcirculation and the no-reflow phenomenon, which significantly worsen the results of treatment and patient prognosis, are often observed during stent implantation in MI patients [11, 12].

No randomised trials comparing *bailout* stenting after failed balloon angioplasty with the strategy of routine stent

implantation in patients with MI have been published. Thus, direct comparisons of the two techniques in the setting of MI are unavailable.

In the present study, two groups of patients with MI treated with two distinct strategies in different time periods were compared: balloon coronary angioplasty completed by coronary stent implantation as *bailout* stenting vs. routine stent implantation procedures irrespective of balloon angioplasty result. The impact of these two approaches on early outcome and late mortality was evaluated. Basic clinical characteristics were similar in the compared groups. Significant differences between groups with respect to age, duration of chest pain and rate of thrombolysis applied prior to admission resulted from different periods of patient treatment in the analysed subgroups. No results of large clinical trials on efficacy of invasive therapy of MI in the elderly were available so that no definite guidelines on invasive treatment in this particular group of patients could be proposed. In our centre in the years 1998 and 1999 patients with diagnosed MI were selected for interventional therapy up to 6 hours while from 2000 up to 12 hours after the onset of chest pain – based on the due recommendations at that time – which resulted in shorter duration of pain in group 1. Due to the importance of time elapsing from the onset of pain to the intervention, we decided to carry out subanalyses in both groups, limited to patients with pain duration not exceeding 6 hours. Multivariate analysis showed that in the examined groups duration of chest pain did not have significant effects on the early outcomes and long-term mortality. In the earlier period more often fibrinolysis preceding transfer to the centre that performed PCI procedure was employed. The difference between groups regarding this issue resulted from the profile of patients who were referred to our centre (after upstream thrombolysis).

Published studies presenting detailed comparisons of patients similar to our groups are lacking. Thus, our findings were compared with subanalyses of randomised trials such as CADILLAC, FRESCO and Mahdi et al. study. In these subanalyses, patients found in cardiogenic shock, like in our study, were excluded. In these studies patients did not differ with respect to age, while Mahdi et al. reported significantly older subjects in the *bailout* stenting group [13-15]. In the subanalysis of the CADILLAC trial, similarly to our study, the time period from onset of pain to intervention was significantly shorter in the group of patients who underwent *bailout* stenting [13]. One should note that in these studies comparisons involved patients who underwent routine stent implantation and a group of subjects who had rescue stent implantation, and so patients with optimum balloon angioplasty result were excluded from the study. It should also be stressed that these subanalyses were derived from randomised trials. Thus, they do not reflect real world practice and conclusions should be treated with caution.

The groups of patients analysed in this study presented comparable angiographic characteristics. Flow of TIMI 2 or 3 at baseline was observed more frequently in group 1. It is associated with preceding thrombolysis applied in this group of patients, strictly linked with the period of patient treatment.

According to study assumptions, coronary stents were implanted more often in group 2. In the reports on *bailout* stenting in MI, different percentages of patients requiring stent implantation as 'rescue' procedure are reported. Mahdi et al. showed 100% feasibility of stent introduction and deployment in IRA in both the *bailout* group and routine stenting one. In this study, among patients selected for balloon angioplasty in 13% *bailout* stenting was performed. However, this group involved rather a small number of patients [15]. In the FRESCO study, among patients selected primarily to balloon angioplasty approximately one third (32%) did not undergo randomisation and had a stent implanted as a rescue procedure. Stent implantation efficacy in this group was 79%. To compare, in a group of subjects who underwent routine stenting, all patients had stent successfully implanted [14]. In the subanalysis of the CADILLAC trial, *bailout* stenting due to intracoronary intervention complications or suboptimal result was performed in 16.1% of patients randomised to balloon angioplasty and reached efficacy of 100% [13]. In our analysis, *bailout* stent implantation was carried out in 34.4% of patients with MI treated with balloon angioplasty. This result is similar to the findings presented in the FRESCO study. Meanwhile, in the group of patients who had a stent implanted irrespectively of balloon angioplasty result, successful introduction and stent deployment was noted in 83% of patients. It should be emphasised that in the aforementioned analysis, stenting was not abandoned in the case of coronary artery calcification, infarction lesion localised on the vessel bifurcation and in the presence of thrombosis inside the vessel lumen. When analysing data on the rate of stent use in particular subgroups, one should note that this percentage in the group of routine stent use reflects interventional reality. Despite technological developments in device design and increasing experience of cardiologists, coronary stent implantation in the infarct-related artery is not always successful. In our study, we always attempted to implant intracoronary stents if devices of appropriate length and diameter were available. In the literature devoted to rescue stenting, patients with stents implanted on *bailout* priority were usually reported (thus excluding patients who underwent isolated balloon angioplasty). And even if they were assessed together, they were usually matched to patients with 100% stenting rate.

In our study in-hospital mortality was low and similar in both groups. Different results were shown by Mahdi et al., who revealed a significantly higher number of deaths during hospitalisation in a group of patients with stent implanted as a *bailout* procedure (11 vs. 0%; p=0.01) [15]. Similarly as for in-hospital observations, applied strategies of stenting did not influence 24-month mortality. In the studies comparing management strategies of routine and

bailout stenting, the long-term results were shown for markedly shorter follow-up. Mahdi et al. reported higher mortality rate in the *bailout* stenting group during 8-month follow-up. However, this difference did not reach statistical significance (4 vs. 0%; p=NS) [15]. Meanwhile, in the subanalysis of the CADILLAC trial, as in the above-mentioned study, mortality was comparable in both groups (4.9 vs. 4.2%; p=NS). However, follow-up time was 12 months [13].

Based on the data on in-hospital and late mortality, we can conclude that invasive treatment of MI patients with balloon angioplasty completed by stent implantation in the case of its complications or suboptimum effect (*bailout* stenting) is not a strategy inferior, with respect to mortality, to routine stenting. However, it is known that in patients who undergo routine stent implantation, lower rate of thrombosis or restenosis is observed in the long term. It may be the analysis of a very large patient group that will reveal reduction in mortality among patients treated with routine stenting. It should be pointed out that the results reflect real life practice, where the rate of patients with routine intracoronary stenting reaches 90%. Interventional cardiologists know that a 100% stent implantation rate is impossible (tortuous vessels, calcifications, small vessel diameter, unsuccessful crossing of the lesion with the guidewire, not uncommonly TIMI 0 blood flow following balloon angioplasty). In the literature no such approach to the comparisons can be found. Thus it is difficult to compare the findings of our analysis to data derived from other studies with 100% efficacy of stenting. Further studies are needed (including randomised ones), particularly with tissue perfusion assessment, because currently only such reports can confirm the above thesis.

Study limitations

We were not able to collect data on the rate of mortality-lowering medication use in long-term follow-up (such as statins, beta-blockers, ACE inhibitors).

The second limitation may be an imbalance of the groups with respect to different rate of abciximab administration or upstream streptokinase. In the case of streptokinase, this is the result of the distinct strategy of management in our region as well as referral of some patients to our cardiology centre after thrombolysis. However, a low percentage of abciximab use was caused mainly by the lack of reimbursement of this medication at that time by the National Health Fund.

Conclusions

In patients with STEMI, application of balloon angioplasty with *bailout* stenting does not increase early and late mortality in comparison with routine stent implantation.

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Porównanie wyników leczenia chorych z ostrym zawałem mięśnia sercowego z uniesieniem odcinka ST poddanych implantacji stentu w schemacie *bailout* i rutynowym

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Streszczenie

Wstęp: W ostatnich latach dokonał się istotny postęp w dziedzinie inwazyjnego leczenia zawału serca (MI). Wcześniej podstawową metodą inwazyjnego leczenia chorych z MI była angioplastyka balonowa z ewentualnym ratunkowym użyciem stentów (ang. *bailout stenting*). Obecnie rutynowo wykonuje się zabieg stentowania. Brakuje badań porównujących te dwa schematy inwazyjnego leczenia MI.

Cel: Porównanie wyników wewnątrzszpitalnych i śmiertelności w obserwacji odległej u chorych z MI poddanych stentowaniu w schemacie *bailout* oraz rutynowym.

Metodyka: Analizie poddano kolejnych chorych z MI z uniesieniem odcinka ST (STEMI), leczonych w jednym ośrodku, w okresie od stycznia 1998 do października 2003 r. W latach 1998–2000 w centrum, z którego pochodzi analiza, na implantacje stentów decydowano się w razie suboptymalnego wyniku (rezydualnej stenozy po angioplastyce balonowej >50%) lub powikłań angioplastyki balonowej (cech dyssekcji upośledzającej przepływ w tętnicy, reokluzji naczynia w trakcie zabiegu angioplastyki). Od początku 2001 r. stosowano strategię rutynowego stentowania. W niniejszym opracowaniu dokonano porównania przedstawianych wyżej dwóch schematów inwazyjnego leczenia chorych ze STEMI, stosowanych w różnych okresach, w aspekcie oceny wyników wewnątrzszpitalnych oraz śmiertelności w obserwacji odległej. Z analizy wykluczono chorych ze wstrząsem kardiogennym.

Wyniki: Spośród 1992 chorych ze STEMI właściwą analizę ograniczono do grupy 1602 leczonych inwazyjnie (z wyłączeniem chorych ze wstrząsem kardiogennym). U 479 z nich wykonano angioplastykę balonową z użyciem stentów w schemacie *bailout* – grupa I (lata 1998–2000), natomiast u 1123 zastosowano rutynowe stentowanie – grupa II (lata 2001–2003). W grupie I ratunkowo stenty implantowano u 34,4% chorych, podczas gdy w grupie II u 83%. Chorzy w grupie I byli młodsi, mieli krótszy czas bólu zawałowego oraz częściej przed przyjęciem otrzymywali leczenie trombolityczne. Śmiertelność wewnątrzszpitalna była podobna w obydwu grupach (2,9 *vs* 2,4%; p=NS). Częstość zgonów w obserwacji 24-miesięcznej wynosiła 9,8% w grupie I i 10,06% w grupie II (p=NS). Pośród wszystkich czynników analizowanych w niniejszej pracy, które mogły mieć wpływ na liczbę zgonów w obserwacji odległej w badanej grupie, z równania regresji Coksa wynika, że zastosowanie któregoś ze schematów stentowania – czy to *bailout*, czy rutynowego – nie było czynnikiem istotnie zwiększającym ryzyko zgonu w obserwacji odległej.

Wnioski: 1. Skuteczność zabiegu angioplastyki wieńcowej w STEMI jest wysoka i porównywalna w grupach stentowania w schemacie *bailout* i rutynowym. 2. Śmiertelność wewnątrzszpitalna i odległa w STEMI oraz częstość powikłań związanych z leczeniem jest niska i podobna w dwóch strategiach stentowania. 3. Do niezależnych czynników zwiększających ryzyko wystąpienia zgonu w obserwacji odległej po STEMI należą: reokluzja naczynia dozawałowego, obecność wielonaczyniowej choroby wieńcowej, starszy wiek chorych oraz nadciśnienie tętnicze. 4. Chorzy ze STEMI, u których uzyskano pełną drożność tętnicy dozawałowej, oraz chorzy z wyższą frakcją wyrzutową lewej komory mieli niższą śmiertelność w obserwacji 2-letniej. 5. Stosowanie strategii stentowania „na ratunek" nie zwiększyło śmiertelności 2-letniej u chorych ze STEMI.

Słowa kluczowe: zawał mięśnia sercowego, angioplastyka wieńcowa, *bailout stenting*

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