Prognostic importance of the extent of coronary revascularisation in patients with acute coronary syndromes and multivessel disease: one-year prospective follow-up

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Abstract

Background: Interventional treatment improves prognosis in patients with acute coronary syndromes (ACS). However, despite introduction of percutaneous coronary intervention (PCI), the risk of cardiovascular events in patients with multivessel coronary artery disease (MVD) remains significant.

Aim: To evaluate the risk of complications and the prognostic value of MVD in patients with ACS during 1-year follow-up.

Methods: A group of 153 patients with ACS was followed up at a single cardiology unit with round-the-clock PCI capability. Treatment of ACS, the extent of revascularisation, and complications occurring during hospitalisation and 1-year follow-up were analysed. The end points of the study were defined as death from all causes, cardiac death, recurrent ACS and a composite end point (deaths from cardiac causes and recurrent ACS).

Results: During 1-year follow-up, 11 (7.2%) patients died, including 10 patients with MVD without complete revascularisation. Recurrent ACS occurred in 18 (12%) patients, including 13 patients with MVD without complete revascularisation. Presence of a residual significant coronary stenosis in incompletely revascularised patients with MVD was an important risk factor for all-cause mortality and occurrence of a composite endpoint in comparison to MVD patients who underwent complete revascularisation (p = 0.028 and p = 0.046, respectively) and patients with single-vessel disease (p = 0.006 and p = 0.003, respectively).

Conclusions: Incomplete revascularisation during the acute phase of ACS was associated with an increased risk of complications and a significantly increased risk of all-cause mortality and the combined rate of cardiovascular deaths and recurrent ACS. Single-stage PCI of all significant stenoses in MVD patients resulted in better outcomes.

Key words: acute coronary syndromes, multivessel disease, revascularisation, prognosis

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INTRODUCTION

Routine percutaneous coronary interventions (PCI), including balloon angioplasty (POBA) and stenting, along with modern antiplatelet therapy improved early and long-term prognosis in patients with acute coronary syndromes (ACS) [1, 2]. In patients with ST segment elevation myocardial infarction (STEMI), interventional treatment was shown to be superior to fibrinolytic therapy in regard to prevention of death, infarct extension, and recurrent infarction during both early and long-term follow-up. However, this benefit depends largely on restoration of complete coronary vessel patency, defined as Thrombolysis In Myocardial Infarction (TIMI) 3 flow [2–5]. In case of failed PCI and/or inability to restore complete patency of the infarct-related artery (IRA), incomplete reperfusion, or

the presence of multivessel disease (MVD), no improvement of the clinical status and prognosis of the patient is often seen during a longer-term follow-up. MVD, defined as the presence of significant stenoses in other coronary arteries than IRA, may thus constitute a major clinical problem and be associated with an increased risk of recurrent ACS [6–8]. These patients usually undergo staged PCI procedures or coronary artery bypass grafting (CABG), with simultaneous optimisation of drug therapy to stabilise atherosclerotic plaques [7, 9]. If MVD is found (which is the case in about 50% of STEMI patients), the interventional cardiologist and later the heart team must often make a difficult decision regarding the choice and timing of the intervention. Complete revascularisation is defined based on two aspects, anatomic and functional. The aim of complete anatomic revascularisation is to treat all significant coronary lesions regardless of the vessel diameter, or all significant lesions in vessels of a defined diameter. Complete functional revascularisation is defined as treating all significant coronary lesions in arteries supplying viable myocardium [10]. In STEMI patients and ACS patients with MVD, previous studies suggested superiority of an acute intervention limited to IRA, except for patients in cardiogenic shock or with significant stenoses (> 90% vessel diameter) of other coronary arteries, when it is indicated to perform single-stage PCI of all significant lesions. In practice, patients with MVD often undergo elective PCI or CABG several days to weeks after the initial primary PCI, often preceded by additional investigations to evaluate coronary reserve or myocardial viability [9]. Determination of the treatment strategy in case of non-STEMI in a patient with MVD is primarily based on individual judgment of the physician performing PCI, including the clinical status of the patients, severity of coronary artery disease (CAD), and risk scores [11].

The aim of the present study was to evaluate the prognostic importance of MVD, taking into account the extent of coronary revascularisation and the occurrence of treatment complications in ACS patients during a 1-year prospective follow-up.

METHODS

The study was conducted in 2007–2009 in the 2nd Ischaemic Heart Disease Department and Cardiac Catheterisation Laboratory at the Institute of Cardiology, Warsaw, Poland, and included 153 consecutive patients admitted due to ACS (STEMI or non-STEMI) and treated invasively based on the results of angiographic and clinical evaluation. Treatment strategy was determined based on individual judgment of the physician performing PCI, including the clinical status of the patients, severity of CAD, and risk scores. During follow-up visits every 6 months and in all cases of patient-reported symptoms, history was taken and non-invasive investigations were performed (ECG, 12-lead Holter ECG monitoring, echocardiography, and optionally stress testing). During 1-year

follow-up, we recorded the following cardiac events: deaths (due to ACS or non-cardiac causes), recurrent ACS, and PCI and CABG procedures. Coronary angiography at 1 year was not obligatory but it was performed in case of suspected acute stent thrombosis, or following hospital discharge in case of recurrent angina and before elective PCI. Study data were collected during the index hospitalisation due to ACS, and using standardised forms during follow-up visits.

MVD was defined as the presence of a significant IRA stenosis (> 70% vessel diameter) or a > 50% stenosis of the left main coronary artery (left main disease — LMD) with additional significant stenosis (> 70%) of at least one other coronary artery. Complete revascularisation of MVD was defined as PCI or CABG of all significant coronary lesions during a single procedure. Incomplete revascularisation in patients with MVD was defined as the presence of residual significant coronary stenoses (> 70%) despite reperfusion therapy. Single vessel disease (SVD) was defined as the presence of a single significant IRA stenosis (> 70%) or LMD with a > 50% stenosis. Complete reperfusion in SVD was defined as complete IRA patency following PCI (POBA or stent implantation).

Statistical analysis

Statistical analysis was performed using the SAS 9.2 package. Differences between categorical variables were evaluated using the χ^2 test or the exact Fisher test. Quantitative variables were tested, upon verification of their normal distribution, using the Student t test (2-group comparisons) or 1-way analysis of variance (3-group comparisons), with the Tukey's test for post-hoc analyses. In case of irregular variable distributions (e.g., duration of hospital stay), variables were log-transformed to obtain appropriate skewness. Kaplan-Meier survival curves were plotted for selected endpoints (all-cause mortality and the combined endpoint of cardiac death and recurrent ACS), with various levels of revascularisation as the independent variable. The curves were compared using the log rank test. Multivariate Cox proportional hazard model was employed, upon visual verification of the required assumptions, to identify independent predictors of study endpoints, Two-sided null hypotheses were verified at $p \leq 0.05$.

RESULTS

Among 153 patients included into the study, the final analysis included 149 patients with significant coronary lesions in whom the intervention was successful (TIMI 3) flow. The mean patient age was 63.2 ± 11.9 years. The mean duration of angina was 3.3 ± 2.8 h (range 5 min to 12 h). In the study group, STEMI was diagnosed in 105 (70.5%) patients, and non-STEMI was diagnosed in 44 (29.5%) patients.

Table 1. Study group characteristics in relation to the number of coronary lesions and the extent of revascularisation. Single vessel disease (SVD) with complete revascularisation was the reference group

	Overall (n = 149)	SVD (n = 52)	MVD (+) (n = 30)	MVD (–) (n = 67)	P — MVD (+) vs. SVD	P — MVD (–) vs. SVD	P — MVD (–) vs. MVD (+)
Age [years]	63.2 ± 11.9	60.4±12.5	63.7±11.6	65.2±11.4	0.24	**0.0326**	0.56
Age > 70	50 (33.6%)	14 (26.9%)	12 (40%)	24 (35.8%)	0.22	0.30	0.69
Male gender	109 (73.2%)	35 (67.3%)	24 (80%)	50 (74.6%)	0.22	0.38	0.57
BMI [kg/m^2]	27.9 ± 3.8	27.4 ± 4.1	28.3 ± 3.8	28.2 ± 3.7	0.32	0.28	0.93
Hypertension	96 (64.4%)	27 (51.9%)	20 (66.7%)	49 (73.1%)	0.19	**0.0169**	0.52
Diabetes	34 (22.8%)	9 (17.3%)	5 (16.7%)	20 (29.9%)	0.94	0.12	0.17
Hyperlipidaemia	103 (69.1%)	32 (61.5%)	21 (70%)	50 (74.6%)	0.44	0.13	0.63
Smoking	68 (45.6%)	26 (50%)	13 (43.3%)	29 (43.3%)	0.56	0.47	1.00
Previous MI	34 (22.8%)	7 (13.5%)	5 (16.7%)	22 (32.8%)	0.75	**0.0146**	0.10
Previous PCI	16 (10.7%)	6 (11.5%)	1 (3.3%)	9 (13.4%)	0.41	0.76	0.17
Acute STEMI	105 (70.5%)	38 (73.1%)	25 (83.3%)	42 (62.7%)	0.29	0.23	**0.042**
Anterior wall ACS	58 (38.9%)	20 (38.5%)	13 (43.3%)	25 (37.3%)	0.82	0.66	0.57
Heart failure:					0.0285	0.26	0.08
NYHA class II	20 (13.4%)	7 (13.5%)	3 (10.0%)	10 (14.9%)			
NYHA class III	7 (4.7%)	1 (1.9%)	0 (0%)	6 (9.0%)			
NYHA class IV	11 (7.4%)	1 (1.9%)	6 (20%)	4 (6.0%)			
Heart failure (Killip II, III, IV)	38 (25.5%)	9 (17.3%)	9 (30%)	20 (29.9%)	0.18	0.11	0.99
Pulmonary oedema	7 (4.7%)	1 (1.9%)	0	6 (9.0%)	1.0	0.13	0.17
Shock	11 (7.4%)	1 (1.9%)	6 (20.0%)	4 (6.0%)	**0.0087**	0.38	0.06
Pulmonary oedema or cardiogenic shock	18 (12.1%)	2 (3.9%)	6 (20%)	10 (14.9%)	**0.0463**	**0.0465**	0.56

MVD (+) — multivessel disease with complete revascularisation; MVD (–) — multivessel disease without complete revascularisation; ACS — acute coronary syndrome; BMI — body mass index; MI — myocardial infarction; NYHA — New York Heart Association; PCI — percutaneous coronary intervention; STEMI — ST segment elevation myocardial infarction

SVD was present in 52 (35%) patients, and MVD was present in 97 (65%) patients.

Demographic and clinical characteristics of the study groups are shown in Table 1. No significant differences were found between the study groups in regard to conventional risk factors for CAD, such as hypertension, hyperlipidaemia, diabetes, smoking, and obesity.

Compared to the reference group of SVD patients, MVD patients in whom incomplete revascularisation was performed were significantly older, and more frequently had hypertension and a history of myocardial infarction. In contrast, they were less likely to have acute STEMI compared to MVD patients who underwent complete revascularisation. Killip class III–IV heart failure was diagnosed on admission in 25.5% of patients, and cardiogenic shock was significantly more frequent in MVD patients who underwent complete revascularisation compared to SVD patients (p = 0.0087).

In all study groups, significant coronary lesions were most commonly located in the left anterior descending (LAD) artery followed by the right coronary artery (RCA) (Table 2). In MVD patients in whom incomplete revascularisation was performed, LMD was significantly more frequent compared to SVD patients (p = 0.0179). The mean values of the Gensini score in the two groups of MVD patients (with complete or incomplete revascularisation) were significantly higher to the reference group of SVD patients (p = 0.0027 and p < 0.0001, respectively).

The patients were hospitalised for 8 to 17 (median 11) days regardless of the diagnosis. The median duration of hospital stay was 11 days in patients with acute STEMI and 10 days in patients with acute non-STEMI (p = NS).

PCI was performed within 4 h from the onset of pain in most patients (n = 114, 76.5%), and within 6 h in 133 (89.3%) patients. ACS was treated by opening of the occluded IRA significantly less frequently in SVD patients compared to MVD patients in whom incomplete revascularisation was performed. PCI with stenting (using bare-metal stents and drug-eluting stents) was performed in 128 patients, 7 patients

Table 2. Coronary angiographic findings and effects of intervention in patients with single vessel disease (SVD), multivessel disease with complete revascularisation [MVD (+)] and multivessel disease without complete revascularisation [MVD (−)]

	Overall (n = 149)	SVD (n = 52)	MVD (+) (n = 30)	MVD (−) (n = 67)	P — MVD (+) vs. SVD	P — MVD (−) vs. SVD	P — MVD (−) vs. MVD (+)
LMCA > 50%	7 (4.7%)	0	0	7 (10.5%)	NA	0.0179	0.10
LAD > 70%	89 (59.7%)	20 (38.5%)	23 (76.7%)	46 (68.7%)	0.0008	0.0010	0.42
Diagonal branch > 70%	34 (22.8%)	1 (1.9%)	8 (26.7%)	25 (37.3%)	0.0011	< 0.0001	0.31
LCx > 70%	57 (38.3%)	11 (21.2%)	12 (40%)	34 (50.8%)	0.07	0.0010	0.33
Marginal branch > 70%	38 (25.5%)	3 (5.8%)	6 (20%)	29 (43.3%)	0.07	< 0.0001	0.0273
RCA > 70%	80 (53.7%)	17 (32.7%)	15 (50%)	48 (71.6%)	0.12	< 0.0001	0.0389
Gensini score	14.9 ± 6.7	10.6 ± 4.8	15.2 ± 4.9	18.2 ± 6.9	0.0027	< 0.0001	0.0520
Peak troponin level [ng/mL]	21.2 [3.2–65.6]	11.4 [1.2–54.3]	34.7 [8.4–72.0]	21.2 [3.2–54.0]	0.07	0.65	0.13
Peak CK-MB mass [ng/mL]	76 [11.2–190]	44.3 [8.1–154.5]	109.8 [50–206]	75.4 [11.2–220.5]	0.0091	0.51	0.0292
Time from symptom onset to PCI [h]	3.3 ± 2.8	3.4 ± 2.5	3.4 ±2.4	3.2 ± 3.1	0.95	0.72	0.81
Vessel patency	90 (60.4%)	25 (48.1%)	21 (70%)	44 (66.7%)	0.0540	0.0419	0.7461
TIMI flow	2.7 ± 0.7	2.8 ± 0.5	2.8 ± 0.4	2.7 ± 0.7	0.96	0.52	0.45

CK-MB — creatine kinase isoenzyme MB; LAD — left anterior descending artery; LCx — left circumflex artery; LMCA — left main coronary artery; PCI — percutaneous coronary intervention; RCA — right coronary artery; TIMI — Thrombolysis In Myocardial Infarction

underwent both POBA and stenting, and 14 patients underwent POBA only. A single stent was implanted in 107 (71%) patients, 2 stents in 25 (17%) patients, 3 or 4 stents in 2 (2%) patients, and CABG was performed in 4 (2.6%) patients.

Single-stage complete revascularisation was performed in only 11 (11.3%) patients with MVD. Another 43 (44.3%) patients underwent second-stage elective PCI (within 1 month after the discharge), 38 (39%) patients were treated medically and 5 (5.1%) patients were referred for CABG. Elective PCI or CABG was performed in 32 (32.9%) patients with MVD, and complete staged revascularisation was obtained in only 19 (19.5%) patients. Overall, complete revascularisation was obtained in 30 (30.9%) patients with MVD.

Preprocedurally, all patients received acetylsalicylic acid (loading dose of at least 300 mg) and clopidogrel (300–600 mg), followed by standard maintenance doses of both drugs (75 mg daily). A glycoprotein IIb/IIIa inhibitor was used in 59 (39.5%) patients.

Complications were seen during the hospitalisation in 72 (48%) patients, including severe ventricular arrhythmia (ventricular tachycardia and ventricular fibrillation), episodes of atrial fibrillation, conduction and automaticity disturbances requiring temporary or persistent cardiac pacing, episodes of pulmonary oedema and exacerbated heart failure, bleedings of various locations, haematomas and pseudohaematomas at the puncture site, pneumonia, worsening of renal failure and hepatic failure, worsening of asthma/chronic obstructive

pulmonary disease, strokes, resistant hypertension, left ventricular thrombi, acute mitral regurgitation, and pericarditis.

After ACS, patients were followed up for 1 year or until occurrence of a cardiac event (mean 210 ± 118 days). No deaths were noted among MVD patients who underwent complete revascularisation, while among MVD patients in whom complete revascularisation was not achieved, 10.4% of patients died due to ACS and 14.9% patients died due to ACS or non-cardiac causes (p < 0.05 for total mortality compared to the other groups). The combined endpoint was also more frequent in the MVD group without complete revascularisation (p = 0.0016 and p = 0.0460, respectively). Residual coronary stenoses in patients with MVD were also associated with an increased risk of New York Heart Association (NYHA) class III–IV heart failure and more frequent occurrence of ventricular tachycardia (p = 0.045 and p = 0.0286, respectively). The relative risk of combined endpoint in the MVD group without complete revascularisation was 2.8 (95% confidence interval [CI] 1.0–8.8, p = 0.0460) compared to the MVD group with complete revascularisation and 4.9 (95% CI 1.5–15.7, p = 0.0016) compared to the SVD group, and the risk in the MVD group with complete revascularisation compared to the SVD group was 1.7 (95% CI 0.4–8.1, p = NS). Figures 1 and 2 show Kaplan-Meier curves for total mortality and the combined endpoint (cardiovascular death and ACS) in the MVD groups with or without complete revascularisation and in the SVD group.
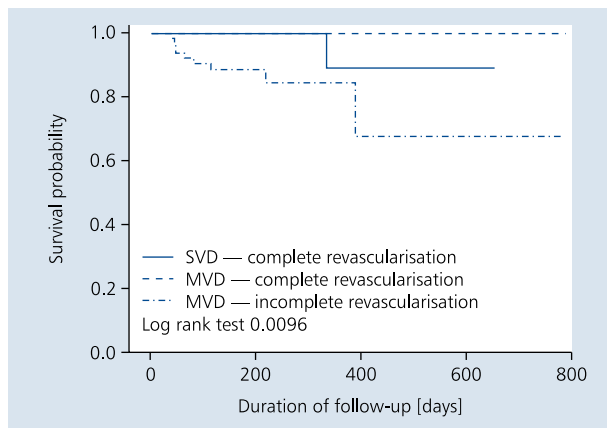
Figure 1. Kaplan-Meier curves for the endpoint of total mortality. Log-rank test: single vessel disease (SVD) vs. multiple vessel disease (MVD) with complete revascularisation: p = 0.7389; SVD vs. MVD with incomplete revascularisation: p = 0.0168; MVD with complete revascularisation vs. MVD with incomplete revascularisation: p = 0.0421
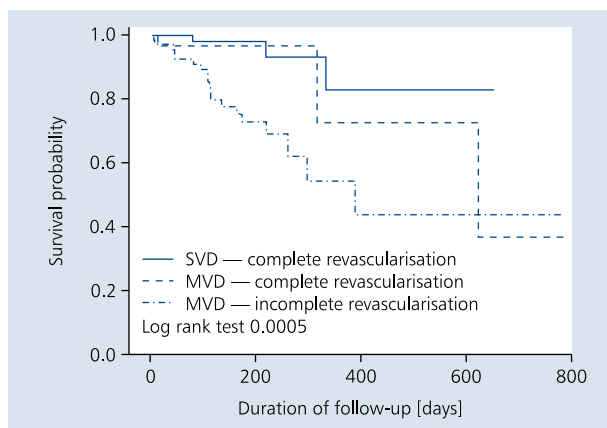

Figure 2. Kaplan-Meier curves for the endpoint of cardiac death and recurrent acute coronary syndrome. Log-rank test: single vessel disease (SVD) vs. multiple vessel disease (MVD) with complete revascularisation: p = 0.4300; SVD vs. MVD with incomplete revascularisation: p = 0.0005; MVD with complete revascularisation vs. MVD with incomplete revascularisation: p = 0.0287

DISCUSSION

In our study population, risk factors for CAD were significantly more frequent compared to the general Polish population according to the NATPOL 2002 and 2011 studies: hypertension was present in 65% of patients, and diabetes in 23% of patients. More than 30% of patients were older than 70 years, and 23% of patients had a history of myocardial infarction. Patients with acute STEMI, who are at a higher risk of possible complications, were predominant in our study population (about 70%). As indicated by clinical trials and registries, patients with acute non-STEMI are currently more prevalent

among those admitted due to ACS and long-term outcomes are paradoxically worse in this patient subset [12]. According to the Polish PL-ACS registry, including 90,153 patients, the proportion of non-STEMI patients increased from 24% in 2004 to 38% in 2010 (p < 0.0001). At the same time, 12-month mortality decreased significantly from 19.1% to 14.5% [13]. Thus, the result of a coronary intervention is of a major importance. In most ACS patients treated with successful PCI of the IRA, clinical outcomes improve [1, 2, 4], while in cases of failed intervention, incomplete reperfusion, no-reflow syndrome, MVD requiring multiple-stage PCI, the patient clinical condition remains unstable or worsens during long-term follow-up. Clinical indicators include exercise and rest pain, episodes of asymptomatic ischaemia in non-invasive testing, no improvement or worsening of echocardiographic wall motion disturbances, and the occurrence of arrhythmia. These patients require readmissions and invasive coronary angiography [6, 7, 14].

During hospitalisation, complications of infarction occurred in 17 (32.7%) patients with SVD and 54 (55.7%) patients with MVD. Clinical and PCI-related complications were associated with a significant prolongation of the hospital stay which ranged from 8 to 17 days. A relatively high number of cardiovascular events and complications indicates that decreasing the duration of hospital stay without evaluation of the risk of recurrent stenosis or severity of lesions in other vessels may often result in apparent reduction in the number of cardiovascular events during the index hospitalisation but is associated with an increased number of these events during long-term follow-up. Thus, shortening of the hospital stay requires improved in-hospital diagnostic evaluation and/or significant improvement of further outpatient care, with adequate access to necessary follow-up investigations.

In our study group, MVD was diagnosed in more than 60% of cases. This is in agreement with observations of other authors and is associated with worse outcomes [15]. Except for few cases of single-stage PCI of two or 3 coronary vessels in the acute period, most patients were referred for another delayed procedure, which may be related to unfavourable reimbursement in cases where treatment consists of a single procedure during the index hospitalisation. Often, despite the presence of significant lesions in other arteries, patients were not referred for further stages of the invasive treatment due to a high procedural risk and/or adverse coronary anatomy. Published studies indicate an increased rate of both recurrent stenoses in the IRA treated with PCI and rapid progression of other lesions, with increased plaque instability, in MVD patients in whom incomplete revascularisation was achieved. The mechanisms of possible effect of other coronary lesions on more frequent occurrence of restenosis within IRA require further studies. Complex and locally unstable atherosclerotic plaques are responsible for ACS but increasing evidence indicates more rapid progression of previously stable plaques and

their evolution in unstable lesions in other coronary arteries that were not subjected to invasive treatment. Postulated mechanisms indicate the effect of inflammation, increased potential for thrombogenesis, and increased platelet activity [6, 7]. Recurrent IRA stenoses and progression of lesions in other coronary vessels are often asymptomatic, indicating the need for follow-up noninvasive testing [16]. Reports of recurrent ACS within one month after the infarction, associated with a 10% mortality rate, suggest that it is advisable to aim for complete revascularisation already during the index hospitalisation. This is particularly the case for high-risk patients with diabetes, post-infarction left ventricular dysfunction, renal failure, hormonal disturbances, and other concomitant conditions. In these situations, CABG or the hybrid approach of minimally invasive cardiac surgery combined with PCI is more beneficial [6–8, 14, 17].

A high number of cardiovascular events in the study group despite a relatively small patient sample allowed assessment of outcomes in patients with MVD. Adverse outcomes in patients with ACS and MVD and incomplete revascularisation or reduced IRA patency may be affected by the fact that these patients are often not referred for further revascularisation procedures [6]. Our findings may provide another evidence in favour of complete revascularisation in patients with ACS and MVD. This is also supported by clinical trial results [18–20]. On the other hand, some data were also published to indicate equivalent outcomes of both treatment approaches [21, 22]. The recently reported IABP SHOCK II trial showed that complete revascularisation of MVD in patients with STEMI and cardiogenic shock did not result in expected benefits compared to those patients in whom revascularisation was limited to IRA [23]. This has likely been an effect of worse patient clinical condition at baseline (due to concomitant conditions) and anatomic factors related to the necrosis area. The current European Society of Cardiology guidelines on the management of acute STEMI highlight inconclusive evidence on the optimal management strategy regarding revascularisation of the remaining significant coronary lesions in patients who underwent PCI of the IRA [9]. Further studies are currently underway, including the PRAGUE 13 and CROSS AMI trials. In 2013, results of the prematurely terminated randomised PRAMI study were reported, indicating that preventive PCI of other vessels in patients with acute STEMI reduced the risk of cardiac death, recurrent infarction and recurrent ischaemia during follow-up [24], which is consistent with our findings.

Limitations of the study

Our single-centre study included a relatively small patient sample which was followed up for 1 year. Upon obtaining patient consent, we included consecutive admitted patients regardless of the ACS type, and the study was not randomised, resulting in the observed proportion between STEMI (70.5%) and non-STEMI (29.5%) in the study population. Due to this distribution of STEMI and non-STEMI patients, direct comparative statistical analyses were inconclusive and did not constitute a major aim of the present study. We assumed that patients received recommended drug therapy (clopidogrel, acetylsalicylic acid, statin, beta-blocker, angiotensin-converting enzyme inhibitor) during the follow-up after hospital discharge. The study material did not include evaluation of coronary lesion severity by other methods (e.g., fractional flow reserve technique).

CONCLUSIONS

Despite highly successful interventional treatment, cardiovascular events or other complications occurred in a large number of patients with ACS, both in-hospital and during 1-year follow-up. Residual significant coronary lesions left without intervention were associated with an increased risk of adverse clinical events, including increased all-cause mortality and an increased rate of cardiovascular events and ACS during follow-up. At the same time, single-stage complete revascularisation in patients with ACS and MVD was associated with improved outcomes.

Conflict of interest: *none declared*

References

1. Almeda FQ, Hendel RC, Nathan S et al. Improved in hospital outcomes in acute coronary syndromes (unstable angina/non-ST segment elevation myocardial infarction) despite similar TIMI risk scores. J Invasive Cardiol, 2003; 9: 502–506.
2. Brodie BR, Grines CL, Ivanhoe R et al. Six-month clinical and angiographic follow-up after direct angioplasty for acute myocardial infarction: final results from the Primary Angioplasty Registry. Circulation, 1994; 1: 156–162.
3. Andersen HR, Nielsen TT, Rasmussen K et al. A comparison of coronary angioplasty with fibrinolytic therapy in acute myocardial infarction. N Engl J Med, 2003; 349: 733–742.
4. 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.
5. Brodie BR, Stuckey TD, Kissling G et al. Importance of infarct-related artery patency for recovery of left ventricular function and late survival after primary angioplasty for acute myocardial infarction. J Am Coll Cardiol, 1996; 2: 319–325.
6. Hannan EL, Racz M, Holmes DR et al. Impact of completeness of percutaneous coronary intervention. Revascularization on long-term outcomes in the stent era. Circulation, 2006; 20: 2406–2412.
7. Kalarus Z, Lenarczyk R, Kowalczyk J et al. Importance of complete revascularization in patients with acute myocardial infarction treated with percutaneous coronary intervention. Am Heart J, 2007; 2: 304–312.
8. Goldstein JA, Demetriou D, Grines CL. Multiple complex coronary plaques in patients with acute myocardial infarction. N Engl J Med, 2000; 343: 915–922.
9. ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). Eur Heart J, 2012; 33: 2569–2619.
10. Ong ATL, Serruys PW. Coronary artery bypass graft surgery versus percutaneous coronary intervention. Circulation, 2006; 114: 249–225.

11. Acute Coronary Syndromes (ACS) in patients presenting without persistent ST-segment elevation (Management of) ESC Clinical Practice Guidelines Eur Heart J, 2011; 32: 2999–3054.

12. Furman MI, Dauerman HL, Goldberg RJ et al. Twenty-two year (1975 to 1997) trends in the incidence, in-hospital and long-term case fatality rates from initial Q-wave and non-Q-wave myocardial infarction: a multi-hospital, community-wide perspective. J Am Coll Cardiol, 2001; 6: 1571–1580.

13. Gierlotka M, Gąsior M, Wilczek K et al. Temporal trends in the treatment and outcomes of patients With non-ST-segment elevation myocardial infarction in Poland from 2004-2010 (from the Polish Registry of Acute Coronary Syndromes). Am J Cardiol, 2012; 109: 779–786.

14. Van den Brand MJ, Rensing BJ, Morel MA et al. The Effect of completeness of revascularization on event-free survival at one year in the ARTS trial. J Am Coll Cardiol, 2002; 4: 559–564.

15. Lekston A, Tajstra M, Gąsior M et al. Impact of multivessel coronary disease on one-year clinical outcomes and five-year mortality in patients with ST-elevation myocardial infarction undergoing percutaneous coronary intervention. Kardiol Pol, 2011; 69: 336–343.

16. Mehta RH, Greenbaum AB, Lokhnygina Y et al. Timing of death and myocardial infarction in patients with non-ST elevation acute coronary syndromes: insights from randomized clinical trials. J Interv Cardiol, 2007; 20: 299–306.

17. Farkouh ME, Domanski M, Sleeper LA et al.; the FREEDOM Trial Investigators. Strategies for Multivessel Revascularization in Patients with Diabetes. N Engl J Med, 2012; 367: 2375–2384.

18. Kim MC, Jeong MH, Ahn Y et al.; Korea Acute Myocardial Infarction Registry Investigators. What is optimal revascularization strategy in patients with multivessel coronary artery disease in non-ST-elevation myocardial infarction? Multivessel or culprit-only revascularization. Int J Cardiol, 2011; 2: 148–153.

19. Dziewierz A, Siudak Z, Rakowski T et al. Impact of multivessel coronary artery disease and noninfarct-related artery revascularization on outcome of patients with ST-elevation myocardial infarction transferred for primary percutaneous coronary intervention (from the EUROTRANSFER Registry). Am J Cardiol, 2010; 3: 342–347.

20. Lehmann R, Fichtlscherer S, Schächinger V et al. Complete revascularization in patients undergoing multivessel PCI is an independent predictor of improved long-term survival. J Interv Cardiol, 2010; 3: 256–263.

21. Brener SJ, Milford-Beland S, Roe MT et al.; American College of Cardiology National Cardiovascular Database Registry. Culprit-only or multivessel revascularization in patients with acute coronary syndromes: an American College of Cardiology National Cardiovascular Database Registry report. Am Heart J, 2008; 1: 140–146.

22. Lee HW, Hong TJ, Ahn SK et al. Comparison of infarct-related artery vs multivessel revascularization in ST-segment elevation myocardial infarction with multivessel disease: Analysis from KAMIR. Cardiology J, 2012; 19: 256–266.

23. Zeymer U, Zahn RK et al. Impact of immediate multivessel intervention on outcome of patients with multivessel disease undergoing primary PCI for cardiogenic shock. Results of the prospective IABP-Shock II trial. Eur Heart J, 2013, 34 (suppl.): 331 (Abstract).

24. Wald DS, Morris JK, Wald NJ et al. for the PRAMI Investigators. Randomized Trial of Preventive Angioplasty in Myocardial Infarction. N Engl J Med, 2013; 369: 1115–1123.

Znaczenie rokownicze zakresu rewaskularyzacji u pacjentów z ostrymi zespołami wieńcowymi i wielonaczyniową chorobą wieńcową w rocznej obserwacji prospektywnej

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Streszczenie

Wstęp: Leczenie interwencyjne chorych z ostrymi zespołami wieńcowymi (ACS) poprawia rokowanie. Jednak mimo rozwoju metod przezskórnych interwencji wieńcowych (PCI) u osób z wielonaczyniową chorobą wieńcową (MVD) ryzyko wystąpienia dalszych zdarzeń sercowo-naczyniowych jest istotne.

Cel: Celem pracy było określenie znaczenia rokowniczego MVD z uwzględnieniem zakresu rewaskularyzacji u chorych z ACS w średnio rocznej obserwacji prospektywnej.

Metody: Grupę 153 pacjentów z ACS obserwowano w jednym ośrodku kardiologicznym. Analizowano sposoby i wyniki leczenia ACS. Końcowe punkty badania zdefiniowano jako: zgon ze wszystkich przyczyn, zgon z przyczyn sercowych, ponowny ACS oraz złożony punkt końcowy (zgon z przyczyn sercowych i ACS).

Wyniki: W planowanym okresie rocznej obserwacji zmarło 11 (7,2%) chorych, z czego 10 w grupie osób z MVD bez pełnej rewaskularyzacji. Nawrót ACS wystąpił u 18 (12%) pacjentów, w tym u 13 chorych w grupie z MVD bez pełnej rewaskularyzacji. Pozostawienie istotnych zwężeń w tętnicach wieńcowych u chorych z MVD było istotnym czynnikiem ryzyka zgonu ze wszystkich przyczyn oraz złożonego punktu końcowego w porównaniu z pacjentami z MVD poddanymi pełnej rewaskularyzacji (odpowiednio: p = 0,028; p = 0,046) oraz z osobami z chorobą jednonaczyniową (odpowiednio: p = 0,006; p = 0,003).

Wnioski: Niepełna rewaskularyzacja u pacjentów z ACS i MVD istotnie zwiększała ryzyko zgonu ze wszystkich przyczyn, zgonu sercowo-naczyniowego, nawrotu ACS i ryzyko powikłań. Jednoczesna PCI wszystkich istotnych zmian w tętnicach wieńcowych u pacjentów z MVD skutkowała lepszym rokowaniem.

Słowa kluczowe: ostre zespoły wieńcowe, choroba wielonaczyniowa, rewaskularyzacja, rokowanie

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