Original article

Does glucose level at hospital discharge predict one-year mortality in patients with diabetes mellitus treated with percutaneous coronary intervention for ST-segment elevation myocardial infarction?

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Abstract

Background: It has been shown that diabetes mellitus (DM) is an independent prognostic factor in patients with myocardial infarction (MI). In addition to that fact the prognostic significance of blood glucose (BG) abnormalities in the acute phase of MI has also been suggested. Recently, a new prognostic factor has been evaluated – the glucose level at hospital discharge.

Aim: To assess whether the glucose level at hospital discharge is associated with one-year mortality in patients with DM treated with percutaneous coronary intervention (PCI) for ST-segment elevation MI (STEMI), taking into account hypoglycaemic treatment.

Methods: Consecutive patients with STEMI and DM treated with PCI, who survived hospitalisation, were included in the analysis. Patients were assumed to have DM if previous diagnosis of DM or newly diagnosed DM during hospital stay was noted. Criteria of newly diagnosed DM were as follows: fasting BG ≥7 mmol/l at least twice after acute phase of STEMI, BG ≥11.1 mmol/l in a 2-hour glucose tolerance test performed before discharge. Fasting plasma glucose at hospital discharge was used for analysis.

Results: Out of 2762 consecutive patients with STEMI, 565 had DM. In-hospital mortality in this group was 9.4% (53 patients), so the final DM group consisted of 512 patients. After discharge 59 (11.5%) patients died during one-year follow-up. The glucose level at discharge was not an independent prognostic factor of one-year mortality in the whole analysed group, however insulin treatment at discharge was (HR 2.61, 95% CI 1.29-5.29; p=0.008). Afterwards, we undertook multivariate analysis separately in the group treated with insulin (253 patients) and in the group treated with oral drugs or diet only (259 patients). This analysis showed that in the group treated with insulin the glucose level at discharge was not an independent prognostic factor of one-year mortality (HR 1.07, 95% CI 0.95-1.22; p=0.27), whereas in patients treated with hypoglycaemic agents or diet it was significantly associated with a one-year mortality (HR 1.30, 95% CI 1.01-1.68; p=0.049).

Conclusions: 1. Patients with STEMI and DM treated with insulin at hospital discharge have higher risk of death, probably because of more advanced DM and more severe complications, than patients treated with oral drugs or diet. 2. Elevated glucose level at hospital discharge predict one-year mortality only in patients with MI and DM treated with oral drugs or diet.

Key words: myocardial infarction, diabetes mellitus, glucose level at hospital discharge

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Introduction

Diabetes mellitus (DM) worsens the prognosis of patients with myocardial infarction (MI) as it is an independent risk factor of death during in-hospital and long-term follow-up [1-3]. The relationship between glucose level measured on admission and the prognosis after MI has been evaluated in this group. Glucose level has been documented to be likely to determine in-hospital and long-term mortality [4, 5], however, other studies did not confirm this association [6-8]. It is worth mentioning that regardless of blood glucose level on admission, elevated glucose level after acute phase of MI may be associated with adverse prognosis. In this patient

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group a significantly lower left ventricular ejection fraction (LVEF), higher mortality and a greater incidence of major adverse cardiovascular events (MACE) than in normoglycaenic patients have been found [9-11]. The DIGAMI 2 (Diabetes and Insulin-Glucose Infusion in Acute Myocardial Infarction) trial results showed that not only does glucose level on admission determine prognosis of patients but glucose level in long-term follow-up may have predictive value as well [12]. It makes one wonder if glucose level at discharge like glucose level on admission can have predictive value in patients with MI and DM. The number of studies addressing this issue is small and the results are discordant. Accordingly, the aim of our study was to assess the relationship between glucose level assessed at discharge and one-year mortality, taking anti-diabetic treatment into account.

Methods

Study group

Consecutive patients with STEMI treated with percutaneous coronary intervention (PCI) between January 1998 and December 2005 were analysed. Patients were scheduled for PCI when they had persistent angina ≥30 minutes, electrocardiographic signs of MI, i.e. ST elevation of ≥0.1 mV in at least two limb leads or ≥0.2 mV in at least two precordial leads or new left bundle branch block, pain to intervention time of up to 12 hours, and when written informed consent was obtained. The study also involved patients with pulmonary oedema, cardiogenic shock and after unsuccessful fibrinolysis. Cardiogenic shock was diagnosed on the basis of clinical and haemodynamic criteria. Haemodynamic criteria included: systemic systolic blood pressure <90 mmHg or drop by 30 mmHg from the baseline lasting for at least 30 minutes without inotropic agents or intraaortic balloon pump support or systolic blood pressure >90 and <110 mmHg on inotropic agents or IABP. Patients who did not have diabetes and those who died during the in-hospital period were excluded from the analysis.

PCI procedure

Prior to coronary angiography all patients received oral 300-500 mg of acetylsalicylic acid, intravenous 5,000-10,000 units of heparin and 2.5-5.0 mg of morphine (if not given earlier). Coronary angiography was performed through the puncture of the femoral artery. Epicardial blood flow was evaluated using the TIMI scale [13]. After coronary angiography and qualification for stenting, patients were given 300 mg of clopidogrel orally (and 600 mg starting from 2005). Additional heparin injections during the procedure were given depending on its course and duration. The PCI was regarded effective when there was TIMI grade 3 flow and the presence of residual stenosis of ≤30% without evidence of dissection limiting blood flow. Following the procedure, patients were referred to the intensive care unit. Urgent coronary angiography was performed in each patient with recurrent angina and concomitant ST elevation, and in case of reocclusion or significant stenosis of the infarct-related coronary artery another PCI was carried out.

Long-term follow-up

Data on clinical and angiographic characteristics and in-hospital and one-year prognosis were stored in the database. One-year follow-up results were assessed based on questionnaires, phone calls and reports from the National Health Fund, which keeps the records of hospitalisations with their causes and procedures performed during the hospital stay.

Definition of diabetes and hypoglycaemic therapy

Diabetic patients were selected using the following criteria: medical history (documented DM treated with insulin or oral anti-diabetic drugs or diet) or elevated glucose level during hospitalisation. Blood glucose level was detected using venous blood at the time the patient was admitted to the hospital and on the next days of hospitalisation as requested by the attending physician. Diabetes *de novo* was diagnosed in the following cases: at least two fasting blood glucose measurements ≥7 mmol/l post AMI or ≥11.1 mmol/l following oral glucose tolerance test done at the end of the hospitalisation period. Criteria of DM diagnosis were adopted according to the guidelines of the European Society of Cardiology and the European Association for the Study of Diabetes [14]. All diabetic patients experiencing AMI were treated with short-acting insulin given as an infusion or subcutaneous injections. The aim of the treatment was to reach the target daily glucose level of 5.6-10.0 mmol. Following AMI and at discharge, if daily demand for insulin was lower than 30 units, the treatment used before MI was applied. If DM was diagnosed in hospital following the acute phase of MI and daily demand for insulin was lower than 30 units, oral hypoglycaemic agents or diet were used. Otherwise, intensive insulin therapy was continued. The fasting glucose level at discharge was used in the final analysis. An assessment of discharge glucose level effect on one-year mortality was made considering anti-diabetic treatment recommended to the patient on discharge day. When concomitant insulin and drug therapy was used, the patient was included to the group treated with insulin.

Statistical analyses

Continuous variables are expressed as means ± standard deviation. Statistical significance of differences between the means was assessed using the ANOVA test. Discrete parameters were compared using χ^2 test (if expected number was <5, the Yates' correction was

applied). Univariate and multivariate analysis included all available parameters that could affect one-year mortality. Not only were statistically significant parameters in the univariate analysis included in the multivariate analysis, but also those that were crucial from the clinical point of view. Effects of individual parameters on one-year mortality were analysed with multivariate regression using a Cox proportional hazard model and results are presented as hazard ratio (HR) and 95% confidence interval (CI). Results were found statistically significant if $p < 0.05$ (two-sided). Statistical analyses and calculations were performed using Statistica PL software version 6.1 (StatSoft Inc.).

Table I. Characteristics of diabetic patients who died and survived during one-year follow-up

Parameter	Survivors (n=453)	Non-survivors (n=59)	p
Clinical characteristics			
Age [years]	61.5±10.3	65.6±9.9	0.004
Females [%]	41.5	57.6	0.02
Mean duration of chest pain [h]	6.3±6.6	6.1±5.7	0.81
Arterial hypertension [%]	69.8	79.7	0.12
Hypercholesterolemia (total cholesterol level ≥5.2 mmol/l) [%]	57.2	49.2	0.25
Active smoking [%]	46.4	33.9	0.07
Past myocardial infarction [%]	19.7	32.2	0.03
Thrombolytic treatment prior to PCI [%]	24.1	18.6	0.36
Insulin prior to admission [%]	27.4	37.3	0.27
Oral antidiabetic drugs prior to admission [%]	32.0	22.0	0.12
Mean blood glucose on admission [mmol/l]	12.6±5.3	13.6±5.82	0.22
Cardiogenic shock [%]	6.8	11.9	0.17
Pulmonary oedema [%]	3.8	20.3	0.0001
Anterior myocardial infarction [%]	38.2	64.4	0.0001
Angiographic parameters			
Infarct-related artery [%]			0.008
right coronary artery	45.1	20.3	
left circumflex artery	14.8	13.6	
left anterior descending artery	38.2	64.4	
left main coronary artery	0.4	0	
Baseline TIMI flow 0-1 [%]	72.6	78.0	0.35
Multi-vessel coronary artery disease [%]	57.6	67.8	0.16
Use of stents [%]	71.1	71.2	0.99
Final TIMI flow 3 [%]	85.4	78.0	0.05
Re-occlusion [%]	6.4	6.8	0.92
Administration of abciximab [%]	6.0	6.8	0.95
In-hospital follow-up			
Maximum creatine kinase level [IU/l]	2071.4±2056.2	2557.6±2578.0	0.21
Left ventricular ejection fraction [%]	44.4±13.9	37.0±8.3	0.0001
Gastro-intestinal bleeding [%]	2.0	13.6	0.0001
Transfusion of red blood cells [%]	3.3	11.9	0.002
Urgent CABG [%]	0.7	1.7	0.41
Stroke [%]	2.7	8.5	0.02
Mean hospitalisation duration [days]	8.9	10.8	0.01
Mean blood glucose on discharge [mmol/l]	7.9±2.9	8.8±3.4	0.06
Insulin on discharge [%]	47.0	67.8	0.003
Sulphonylurea derivatives on discharge [%]	28.3	25.4	0.65
Biguanides on discharge [%]	6.4	3.4	0.36

Results

The analysis involved 2762 consecutive patients with STEMI treated with PCI; 565 (20.5%) diabetic patients were selected from this group. During the in-hospital period 53 (9.4%) patients died. Finally, the study group comprised 512 diabetic patients. The percentage of DM diagnosed in hospital was 7.8% (40 patients).

During one-year follow-up 59 (11.5%) patients died. Of note, patients who died more frequently received insulin than those who survived (67.8 vs. 47.0%, p <0.003). Moreover, a tendency towards higher mean glucose level has been observed. Other parameters are shown in Table I.

Multivariate analysis did not indicate glucose level at discharge to be an independent factor determining one-year mortality. At discharge, a strong correlation between one-year mortality (apart from anterior wall MI and LVEF) and the necessity of using insulin was noted. Multivariate analysis results in the entire study group are presented in Table II.

Next, patients were divided into two groups with respect to treatment of DM. The group treated with insulin involved 253 (49.4%) patients, including 14 patients taking insulin and oral anti-diabetic drugs, whereas there were 259 (50.6%) patients in the group treated with oral anti-diabetic drugs or diet. Patients on insulin treatment had significantly higher mean glucose level at discharge (8.7±3.4 vs. 7.2±2.2 mmol/l; p=0.00001) and higher one year mortality compared to patients treated with oral anti diabetic drugs or diet (15.8 vs. 7.3%, p=0.003).

Logistic regression analysis was performed assessing glucose level at discharge separately for patients treated with insulin and oral anti-diabetic drugs or diet.

In the group treated with insulin the mean glucose level at discharge was comparable in patients who died

Table II. Multivariate analysis of one-year mortality in all diabetic patients

Parameter	HR (95% CI)	p
Insulin on discharge	2.61 (1.29-5.29)	0.008
Anterior myocardial infarction	2.32 (1.31-4.11)	0.004
Left ventricular ejection fraction (per each 1%)	0.94 (0.91-0.97)	0.0001
Age (per each 1 year)	1.02 (0.99-1.06)	0.18
Females	1.26 (0.69-2.3)	0.45
Multi-vessel coronary artery disease	1.24 (0.69-2.21)	0.47
Final TIMI flow 3	0.83 (0.42-1.64)	0.59
Creatine kinase level (per each 100 IU/l)	1.01 (1.00-1.03)	0.11
Arterial hypertension	1.60 (0.82-3.12)	0.17
Cardiogenic shock	1.38 (0.58-3.31)	0.47
Chest pain duration (per each 1 h)	0.99 (0.95-1.04)	0.74
Past myocardial infarction	1.74 (0.92-3.29)	0.89
Blood glucose on admission (per each 1 mmol/l)	1.00 (0.95-1.06)	0.89
Blood glucose on discharge (per each 1 mmol/l)	1.08 (0.98-1.20)	0.14
Sulphonylurea derivatives on discharge	1.71 (0.79-3.71)	0.17
Biguanides on discharge	0.55 (0.12-2.48)	0.44

Table III. Multivariate analysis of one-year mortality in diabetic patients treated with insulin

Parameter	HR (95% CI)	p
Anterior myocardial infarction	2.08 (1.02-4.27)	0.04
Creatine kinase level (per each 100 IU/l)	1.02 (1.01-1.04)	0.006
Left ventricular ejection fraction (per each 1%)	0.93 (0.9-0.97)	0.0005
Cardiogenic shock	2.13 (0.79-5.75)	0.14
Age (per each 1 year)	1.03 (0.99-1.07)	0.17
Chest pain duration (per each 1 h)	0.97 (0.91-1.03)	0.27
Blood glucose on discharge (per each 1 mmol/l)	1.07 (0.95-1.22)	0.27
Blood glucose on admission (per each 1 mmol/l)	0.98 (0.92-1.04)	0.43
Past myocardial infarction	1.35 (0.58-3.14)	0.49
Arterial hypertension	1.28 (0.57-2.86)	0.54
Females	1.13 (0.54-2.36)	0.75
Final TIMI flow 3	0.94 (0.4-2.21)	0.88
Multi-vessel coronary artery disease	0.98 (0.5-1.95)	0.96

Table IV. Multivariate analysis of one-year mortality in diabetic patients treated with oral hypoglycaemic drugs or diet

Parameter	HR (95% CI)	p
Arterial hypertension	4.61 (1.13-18.9)	0.03
Anterior wall myocardial infarction	3.57 (1.2-10.58)	0.02
Blood glucose on discharge (per each 1 mmol/l)	1.30 (1.01-1.68)	0.049
Age	1.02 (0.96-1.09)	0.43
Females	0.77 (0.22-2.77)	0.69
Multi-vessel coronary artery disease	1.77 (0.54-5.74)	0.34
Final TIMI flow 3	0.87 (0.23-3.21)	0.83
Creatine kinase level (per each 100 IU/l)	0.96 (0.91-1.01)	0.10
Left ventricular ejection fraction (per each 1%)	0.96 (0.9-1.03)	0.23
Cardiogenic shock	1.11 (0.12-9.99)	0.92
Chesrt pain duration (per each 1 h)	1.04 (0.95-1.14)	0.34
Past myocardial infarction	2.48 (0.85-7.21)	0.95
Blood glucose on admission (per each 1 mmol/l)	1.07 (0.96-1.19)	0.25

and in patients who survived over one-year follow-up (9.1 vs. 8.6 mmol/l, p=0.54). The parameters associated with mortality included anterior MI, level of myocardial necrosis markers and LVEF. Multivariable analysis results are presented in Table III.

In the group treated with oral anti-diabetic drugs or diet blood glucose level at discharge was significantly higher in patients who died than in those who survived (8.4 vs. 7.1 mmol/l, p=0.04). Thus, in contrast to patients treated with insulin, in this group glucose level at discharge was, apart from arterial hypertension and anterior MI, an independent predictive factor determining one-year mortality. Multiariable analysis results are shown in Table IV.

Discussion

There is a growing number of reports suggesting the relationship between glucose level measured after MI and the outcome. It has been documented that patients with higher glucose level are older, there are more females among them, they have more frequently arterial hypertension, and glucose level ≥7 mmol/l is likely to be an independent factor of increased 30-day mortality [15]. In an analysis carried out by Sal et al., it was shown that patients with mean glucose level >6.67 mmol/l, measured within 4 days of admission to the hospital, had a significantly higher 28-day mortality rate. Additionally, increased glucose level was identified as an independent factor determining mortality rate [10]. The DIGAMI 2 trial showed that not the way of treating DM but glucose level per se had a major influence on the prognosis in patients surviving MI. For each 3 mmol/l of fasting glucose increase (determined over long-term follow-up) the risk of death increased by 1.2 times [12].

Hypoglycaemic treatment

Our study showed that approximately 40% of diabetic patients prior to admission did not use insulin or oral anti-diabetic drugs. This percentage may seem to be high. It is noteworthy that in an analysis done by Granger and et al. there were even 30% of diabetic patients not treated with insulin or oral anti-diabetic drugs prior to hospital admission [16]. In the CADILLAC (Controlled Abciximab and Device Investigation to Lower Late Angioplasty Complications) study the percentage of diet used for treatment of DM prior to hospital admission constituted roughly 20% [17]. Besides, in the DIGAMI study in 24.2% patients only diet was used or no anti-diabetic treatment was administered at all prior to admission [18]. In our study, 16.6% of patients at the time of discharge from hospital did not need treatment with insulin or oral anti-diabetic drugs. Similar conclusions were seen in the DIGAMI 2 trial, where the percentage was 14.9% [12].

Blood glucose level at discharge

Our study showed that patients who died during one-year follow-up had mean discharge glucose level higher by about 1 mmol/l in comparison to patients who survived. However, multivariate analysis showed no significant relationship between glucose level and one-year mortality. It makes one wonder why there is no correlation between glucose level and prognosis. In the DIGAMI study, glucose level at discharge was significantly higher in the group not being intensively treated with insulin in comparison to the patients receiving insulin. One-year mortality was also higher in this patient group. The relationship between glucose and prognosis was not subjected to analysis in that study [18]. In our study, the strongest factor having a negative impact on the prognosis turned out to be insulin treatment at discharge. This observation seems to be of great importance as almost 50% of patients required insulin therapy. The relationship between the way of treating DM and long-term mortality has been demonstrated by other authors. Mak et al. reported that diabetic patients treated with insulin had significantly higher one-year mortality rate compared to patients not treated with insulin (17.8 vs. 13.1%) [19]. The necessity of insulin use was regarded as an independent factor of increased one-year mortality [17]. Gustafsson et al. reported similar findings in a 6-year follow-up [20].

In our study multivariate analysis performed in the group treated with insulin showed no correlation between glucose level at discharge and one-year mortality. The lack of this relationship may be due to a number of factors. It is well known that patients with DM who need insulin therapy constitute a group experiencing more severe DM. It is strictly connected with the advancement of changes in the cardiovascular system. We are far from being able to give a logical and clear explanation as to why glucose level at discharge is an independent prognostic factor in patient treated with pharmacologycal agents or diet but not in the group treated with insulin. If other factors were involved, multivariate analysis should disclose them, which was not the case in our study. In addition, one may speculate that in patients treated with insulin it is harder to reach the target glucose level. Our results showed that in patients treated with insulin, glucose level at discharge was by 1.5 mmol/l higher than in patients treated with oral anti-diabetic drugs or diet.

Noteworthy is the fact that in patients treated with oral anti-diabetic drugs or diet, glucose increase by 1 mmol/l at discharge was associated with incremental increase of risk of death by 30% in one-year follow-up. This finding is of great clinical importance as it enables physicians to identify patients who are at higher risk of death. It should be remembered that glucose level is

a parameter which may be subject to modification through suitable anti-diabetic treatment.

Factors influencing one-year mortality

Due to significantly worse prognosis in patients with MI and DM compared to non-diabetics, identification of parameters predictive for mortality in this group seems to be essential. Apart from the above-mentioned type of DM treatment, the following independent risk factors of mortality were established: age, gender, smoking, past MI, prior revascularisation or congestive heart failure, glucose and creatinine levels on admission and the duration of DM [4, 12, 18].

In our study the factor of the greatest predictive value was the necessity to use insulin at discharge. Anterior MI was a strong prognostic factor both in the entire study group and in patients selected depending on the treatment of DM. Additionally, LVEF was another factor affecting one-year mortality. For each 1% increase of LVEF the risk of mortality was reduced by 6% in the entire analysed group and by 7% in patients treated with insulin. In the group of patients with DM treated with insulin it has been observed that for each creatine kinase increase of 100 IU/l the risk of mortality increased by 2%. In addition, in diabetic patients on oral anti-diabetic drugs or diet, arterial hypertension was documented to be a significant negative prognosis factor. Svensson et al. showed a similar relationship between the prevalence of arterial hypertension and higher mortality rate [4].

What seems to be the most important observation of our study is the finding of increased glucose level at discharge as an adverse prognostic factor in patients treated with oral anti-diabetic drugs or diet. Considering the small number of prognostic parameters in this patient group, this finding may have additional importance in risk stratification.

Study limitations

A study limitation was the lack of analysis of DM compensation at one-year follow-up. Unfortunatly the glucose HbA_{1c} levels or the changes of anti-diabetic treatment at that time point were not available. Nevertheless, it seems that the study limitations had no significant influence on the main message of this paper, that is the prognostic value of glucose level at discharge urging the necessity of more intense diabetic care.

Conclusions

1. Patients with STEMI treated with insulin at discharge are at higher risk of death, most likely due to more severe DM and its complications, compared to patients on oral anti-diabetic drugs or diet at discharge.
2. Blood glucose level measured at discharge has prognostic value only in the group treated with hypoglycaemic agents or diet.

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Czy poziom glikemii przy wypisie u chorych z zawałem serca i cukrzycą leczonych przezskórną interwencją wieńcową wpływa na śmiertelność jednoroczną?

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Streszczenie

Wstęp: Cukrzyca jest niezależnym czynnikiem ryzyka zgonu w obserwacji wewnątrzszpitalnej i odległej u chorych z zawałem serca (MI). W grupie tej poznano wpływ poziomu glikemii przy przyjęciu na rokowanie. Zwraca się uwagę na fakt, że niezależnie od poziomu glikemii przy przyjęciu, podwyższony poziom glikemii po ostrej fazie MI może być związany z gorszym rokowaniem. Zastanawiające jest, czy poziom glikemii przy wypisie, tak jak poziom glikemii przy przyjęciu, może mieć znaczenie rokownicze.

Cel: Ocena wpływu poziomu glikemii przy wypisie u chorych z MI z uniesieniem odcinka ST (STEMI) i cukrzycą leczonych przezskórną interwencją wieńcową (PCI) na śmiertelność jednoroczną, z uwzględnieniem sposobu leczenia hipoglikemizującego.

Metodyka: Przeanalizowano kolejnych chorych ze STEMI leczonych PCI. Z analizy wyłączono chorych bez cukrzycy oraz chorych, którzy nie przeżyli okresu wewnątrzszpitalnego. Grupę chorych z cukrzycą wyodrębniono na podstawie wywiadu (udokumentowana cukrzyca leczona insuliną lub doustnymi lekami hipoglikemizującymi, lub dietą) oraz podwyższonych wartości glikemii w trakcie hospitalizacji. Nowo rozpoznaną cukrzycę stwierdzano, jeśli poziom glikemii był co najmniej dwukrotnie podwyższony na czczo ≥7 mmol/l po ostrej fazie MI lub ≥11,1 mmol/l po doustnym teście obciążenia glukozą, wykonanym pod koniec hospitalizacji. W analizie uwzględniono poziom glikemii oznaczony na czczo w dniu wypisu. Oceny wpływu poziomu glikemii przy wypisie na śmiertelność jednoroczną dokonano z uwzględnieniem sposobu leczenia hipoglikemizującego.

Wyniki: Analizie poddano 2762 kolejnych chorych ze STEMI. Z grupy tej wyodrębniono 565 (20,5%) chorych z cukrzycą. W okresie wewnątrzszpitalnym zmarło 53 (9,4%) chorych. Ostatecznie grupę badaną stanowiło 512 chorych z cukrzycą. W obserwacji jednorocznej po wypisie zmarło 59 chorych (11,5%). Przeprowadzona analiza wieloczynnikowa nie wskazała poziomu glikemii przy wypisie jako niezależnego czynnika determinującego śmiertelność jednoroczną (HR 1,08, 95% CI 0,98–1,2; p=0,13). Obserwowano natomiast silną korelację śmiertelności jednorocznej – poza zawałem ściany przedniej i frakcją wyrzutową lewej komory (LVEF) – z koniecznością stosowania insuliny przy wypisie (HR 2,61, 95% CI 1,29–5,29; p=0,008). W dalszej części badania chorych podzielono na dwie grupy w zależności od sposobu leczenia cukrzycy. W grupie leczonej insuliną znajdowało się 253 (49,4%) chorych, natomiast w leczonej doustnymi lekami hipoglikemizującymi lub dietą – 259 (50,6%) chorych. Wykazano istotnie wyższy średni poziom glikemii przy wypisie (8,7±3,4 *vs* 7,2±2,2 mmol/l; p=0,00001) oraz wyższą śmiertelność jednoroczną (15,8 *vs* 7,3%; p=0,003) w grupie chorych leczonych insuliną w porównaniu z chorymi leczonymi doustnymi lekami hipoglikemizującymi lub dietą. W grupie chorych leczonych insuliną nie wykazano istotnej statystycznie zależności pomiędzy poziomem glikemii przy wypisie a śmiertelnością jednoroczną (HR 1,07, 95% CI 0,95–1,22; p=0,27). Natomiast parametrami determinującymi tę śmiertelność były: zawał ściany przedniej, poziom enzymów martwiczych mięśnia sercowego oraz LVEF. W przeciwieństwie do chorych leczonych insuliną, w grupie leczonej doustnymi lekami hipoglikemizującymi lub dietą poziom glikemii przy wypisie, oprócz nadciśnienia tętniczego i zawału ściany przedniej, był niezależnym predyktorem śmiertelności jednorocznej (HR 1,30, 95% CI 1,01–1,68; p=0,049).

Wnioski: 1. Chorzy ze STEMI leczeni przy wypisie insuliną mają zwiększone ryzyko zgonu, prawdopodobnie z powodu większego zaawansowania cukrzycy i jej powikłań, niż chorzy, u których przy wypisie stosuje się doustne leki hipoglikemizujące lub dietę. 2. Poziom glikemii oznaczany przy wypisie ma znaczenie rokownicze jedynie w grupie leczonej doustnymi lekami hipoglikemizującymi lub dietą.

Słowa kluczowe: zawał serca, cukrzyca, poziom glikemii przy wypisie

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