

Role of impaired glucose tolerance in patients with acute myocardial infarction in relation to sex

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KEY WORDS

diabetes, glucose, mortality, risk, stroke

ABSTRACT

INTRODUCTION Impaired glucose tolerance (IGT) has a negative impact on the outcome of patients with acute myocardial infarction (AMI).

OBJECTIVES The aim of the study was to compare the effect of IGT on early and late prognosis in women and men with AMI treated with percutaneous coronary intervention (PCI).

PATIENTS AND METHODS Based on the results of oral glucose tolerance test, 560 patients with IGT (395 men, 165 women) were selected out of a single center registry of 2733 consecutive patients with AMI. Sex-related mortality and major adverse cardiovascular events (MACEs) including myocardial reinfarction, stroke, or repeat revascularization during hospitalization and long-term follow-up were compared in the whole study population and within the high-risk subgroups.

RESULTS Mortality and MACE rates were comparable between men and women except for a higher stroke rate in women (4.8% vs. 1.5%, $P < 0.05$). No significant differences were observed in the subgroups of patients with reduced ejection fraction ($< 35\%$) and those aged above 70 years, during both short and long-term follow-up. However, in women compared with men, higher stroke rates were observed in the subgroup of patients with incomplete revascularization (6.9% vs. 1.1%, $P < 0.05$) and higher total mortality rates in the subgroup with renal dysfunction (40% vs. 16%, $P < 0.05$). Female sex was an independent risk factor for stroke (hazard ratio [HR], 2.94; $P = 0.048$) and MACEs (HR, 1.45; $P = 0.009$), but not for death, in the population of patients with AMI and IGT.

CONCLUSIONS Mortality in women and men with AMI treated with PCI with concomitant IGT is comparable, but female sex is an independent risk factor for stroke and MACEs, particularly worsening prognosis in patients with renal dysfunction.

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INTRODUCTION Glucose abnormalities have a negative effect on cardiovascular risk. This issue has attracted considerable scientific interest in recent years owing to a great number of people with glucose abnormalities. In the Framingham Heart Study Offspring cohort, 63% of the subjects were normoglycemic, 29% had impaired fasting glucose (IFG) or impaired glucose tolerance (IGT), 3.4% had newly developed diabetes, and 4.6% had known diabetes.¹

In patients with stable coronary artery disease, the disturbances of glucose regulation are

present in 44% to 69% of the cases.²⁻⁴ It is known that the population with acute myocardial infarction (AMI) has a high prevalence of glucose and metabolic abnormalities. Diabetes mellitus is detected in 27% to 32% and IGT in 33% to 37% of patients with AMI.⁵⁻⁷

In a study by Bartnik et al.,⁷ glucose tolerance was normal in 35% of the patients with AMI and abnormal (IGT or newly detected diabetes), in 67%. Abnormal glucose tolerance was one of the strongest predictive factors for future major adverse cardiovascular events (MACEs), including

TABLE 1 Comparative analysis of demographic, clinical, and laboratory data between men and women in the whole population with impaired glucose tolerance

Variable	Men, n = 395	Women, n = 165	P value
age, y	61.1 ± 9.9	65.1 ± 10.9	<0.05
BMI, kg/m ²	27.4 ± 3.8	27.1 ± 4.4	NS
prior AMI	78 (19.7)	16 (9.6)	<0.05
previous CABG	9 (2.3)	3 (1.8)	NS
previous PCI	42 (10.7)	11 (6.7)	NS
cardiogenic shock on admission	15 (3.8)	8 (4.7)	NS
hypertension	205 (51.9)	96 (58)	NS
hyperlipidemia	194 (49.1)	101 (61.3)	<0.05
atrial fibrillation	34 (8.6)	18 (10.8)	NS
smoking	238 (60.4)	79 (47.9)	<0.05
multivessel coronary artery disease	246 (62.3)	100 (60.6)	NS
symptom duration, h	5.9 ± 6.7	5.7 ± 6.4	NS
use of glycoprotein IIb/IIIa inhibitors	55 (14.0)	25 (15.2)	NS
TIMI <3 after PCI	46 (11.6)	26 (15.9)	NS
EF, %	43.1 ± 7.9	44.9 ± 7.7	<0.05
glucose on admission, mmol/l	7.6 ± 2.3	8.0 ± 2.8	NS
creatinine on admission, μmol/l	90.9 ± 35.9	74.9 ± 26.6	<0.05
eGFR on admission, ml/min/1.73 m ²	85.8 ± 25.1	80.0 ± 25.6	<0.05
total cholesterol, mmol/l	5.64 ± 1.29	6.16 ± 1.39	<0.05
triglycerides, mmol/l	1.41 ± 1.14	1.26 ± 0.84	NS
LDL cholesterol, mmol/l	3.67 ± 1.12	3.97 ± 1.25	<0.05

Data are presented as number (percentage) or mean ± standard deviation.

Abbreviations: AMI – acute myocardial infarction, BMI – body mass index, CABG – coronary artery bypass grafting, EF – ejection fraction, eGFR – estimated glomerular filtration rate, LDL – low-density lipoprotein, NS – nonsignificant, PCI – percutaneous coronary intervention, TIMI – Thrombolysis in Myocardial Infarction

TABLE 2 Pharmacological treatment after discharge from hospital

	Men, n = 395	Women, n = 165	P value
aspirin	391 (99.1)	163 (98.8)	NS
clopidogrel / ticlopidine	375 (94.9)	157 (95.1)	NS
β-blockers	364 (92.1)	153 (92.7)	NS
ACEIs/ARBs	359 (90.9)	150 (91.0)	NS
statins	351 (88.9)	147 (89.1)	NS
diuretics	190 (48.1)	79 (47.9)	NS

Data are presented as number (percentage).

Abbreviations: ACEIs – angiotensin-converting enzyme inhibitors, ARBs – angiotensin II receptor blockers

cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, or severe heart failure. Apart from diabetes, also IGT is associated with an increased cardiovascular risk.^{2,8} Therefore, early detection of any abnormalities in glucose metabolism is particularly important.

In a study by Opolski et al.,⁹ the oral glucose tolerance test (OGTT) was performed only in 13% of the patients with coronary artery disease (in randomly selected primary care offices) within the 15 months preceding the study.

Kowalska et al.² showed that postload glucose concentrations significantly correlated with the progression of atherosclerotic lesions in the coronary arteries in patients with stable coronary artery disease undergoing coronary angiography.²

The risk of cardiovascular diseases can be increased as many as 15 years before diabetes is diagnosed.⁸ About 60% of individuals who develop diabetes have either IGT or IFG 5 years before the diagnosis of diabetes.¹⁰ It has been proved that glucose abnormalities are more common in women than in men with AMI,¹¹ but there are no studies presenting differences in short- or long-term outcome between men and women with AMI and concomitant IGT.

The aim of our study was to assess the short- and long-term outcome in patients with AMI treated with percutaneous coronary intervention (PCI) with concomitant IGT in relation to sex.

PATIENTS AND METHODS The study population was selected from 2733 consecutive patients with AMI treated with primary PCI between 2003 and 2007. Based on the results of the OGTT, which was performed before discharge, 560 patients with IGT (395 men, 165 women) were selected.

IGT was diagnosed if the blood glucose concentration after 2 hours of the OGTT was from 7.8 mmol/l to less than 11.1 mmol/l.

The clinical data were recorded in a database that represented part of a single-center AMI registry. Information about long-term outcome was collected in a database of the National Fund of Health. The mean follow-up period was 29.4 months.

A comparative analysis was performed between men and women in the whole group with IGT and within high-risk subgroups: patients with low ejection fraction (EF, <35%; n = 413), aged 70 years or older (n = 411), those with incomplete revascularization (ICR; n = 298), and a subgroup with chronic kidney disease (CKD; n = 388). CKD was defined as an estimated glomerular filtration rate (eGFR) of less than 60 ml/min/1.73 m² on admission. eGFR was estimated using the Modification of Diet in Renal Disease formula.

ICR was defined when total occlusion or residual stenosis exceeding 70% was observed in any major coronary arteries or their major branches at discharge. Multivessel coronary artery disease was diagnosed when 2 or more major coronary arteries or their major branches were significantly stenosed or occluded. A MACE was defined as the occurrence of death, recurrent myocardial infarction, repeated PCI, coronary artery bypass grafting (CABG), or stroke.

Sex differences were assessed by the χ^2 test for categorical variables and by the *t* test for continuous variables. Survival curves were constructed using the Kaplan–Meier method and differences in survival were assessed with the log-rank test. Independent predictors of death and MACEs were

TABLE 3 Thirty-day and long-term outcomes in men and women in the whole population with impaired glucose tolerance

Variable		Men, n = 395	Women, n = 165	P value
stroke	30-day	1 (0.3)	0 (0)	NS
	total	6 (1.5)	8 (4.8)	<0.05
AMI	30-day	5 (1.3)	4 (2.4)	NS
	total	63 (16)	34 (20.8)	NS
PCI	30-day	5 (1.3)	1 (0.6)	NS
	total	61 (15.5)	29 (17.9)	NS
CABG	30-day	3 (0.8)	0 (0)	NS
	total	34 (8.7)	11 (6.5)	NS
mortality	30-day	6 (1.5)	5 (3.0)	NS
	total	37 (9.3)	20 (12.4)	NS
MACEs	30-day	23 (5.9)	15 (8.9)	NS
	total	158 (39.9)	76 (46.4)	NS

Data are presented as number (percentage).

Abbreviations: MACEs – major adverse cardiac events, others – see TABLE 1

identified with the multivariate Cox-regression model and expressed as hazard ratio with 95% confidence interval. A *P* value of less than 0.05 was considered significant. All analyses were performed using the Statistica v. 6.1 software (Statsoft Inc., Tulsa, Oklahoma, United States).

RESULTS In the whole population with IGT, women were significantly older and more often had hyperlipidemia diagnosed before admission. On the other hand, men had higher rates of previous MI, more often were smokers, and their eGFR on admission was higher. The frequency of prior PCI and CABG did not differ between men and women within the whole population with IGT (TABLE 1). Pharmacological treatment after discharge was comparable in men and women with IGT (TABLE 2).

A comparative analysis in the whole IGT group showed no differences in mortality during 30-day and 1-year follow-up between men and women. Total mortality was also comparable between the 2 groups. In our study group, the rates of PCI, CABG, AMI, and total MACEs did not differ in men and women during follow-up. We observed only a higher rate of all strokes in women (TABLE 3).

A similar analysis was performed for the high-risk subgroups. In women, higher total stroke rates were observed in the ICR subgroup (TABLE 3). Total MACE rates and short- or long-term mortality were comparable in the ICR group. Women in this group were also significantly older than men.

We did not observe differences between men and women in the subgroups of patients with low EF (TABLE 4) and those aged 70 years or older (TABLE 5). Short- and long-term mortality, PCI, CABG, AMI, stroke, and total MACE rates as well as age were similar.

Both MACE rates (for 30-day and entire follow-up) and total mortality were higher in women than in men in the CKD subgroup (also, the prevalence of stroke was higher in women), as shown in

TABLE 5. Women were significantly older in the CKD group. The differences in survival between men and women in this subgroup are presented in FIGURE 1.

In a multivariate regression analysis, the independent risk factors for death were: age ≥ 70 years; cardiogenic shock on admission; symptom duration; fibrinogen level; contrast-induced nephropathy; eGFR < 60 ml/min/1.73 m²; Thrombolysis in Myocardial Infarction (TIMI) < 3 after PCI; multivessel disease; and EF $< 35\%$ (TABLE 6). Sex, ICR, and left main disease did not predict mortality.

Predictors of MACEs included female sex, ICR, and multivessel disease (TABLE 7). Reduced EF ($< 35\%$), TIMI of less than 3, age of 70 years or older, eGFR of less than 60 ml/min/1.73 m², and hypertension were not independent risk factors. Female sex, prior stroke, or transient ischemic attack, and eGFR of less than 60 ml/min/1.73 m² were independent predictors for stroke (TABLE 7).

DISCUSSION An abnormal OGTT test result is an early sign of impaired glucose metabolism.¹² In our study, the OGTT was performed once during hospital stay before discharge. Tenere et al.¹³ showed that patients with AMI had no changes in insulin resistance during a 3-month follow-up after hospitalization. OGTT results at discharge were predictors of the outcome of the OGTT during follow-up.¹³

In our study, IGT was diagnosed in 20.4% of the patients and diabetes, in 33%. We showed higher total stroke rates in women within the whole group with IGT and in the subgroups with ICR and CKD. The analyses showed significant differences in mortality and MACE rates between men and women in the CKD group. In the whole IGT group, sex was an independent risk factor for MACEs but not for death in the multivariate analysis.

Men had reduced EF and more often had a history of MI. Women were older, had higher total cholesterol and low-density lipoprotein cholesterol levels, as well as lower eGFR on admission. Compared with men, more women were admitted to the hospital with cardiogenic shock, more women had a history of hypertension and atrial fibrillation, their glucose levels were higher on admission, and more often a TIMI of less than 3 was observed. The differences in those parameters were not significant, but their combination could explain higher MACE rates in women.

Different results have been reported by authors who compared mortality in men and women with AMI. In the study by Čulić et al.,¹⁴ higher mortality rates were observed in women in the entire population with AMI and in the subgroups of patients aged between 50 and 70 years and those older than 70 years. The female sex was one of the independent predictors of an adverse hospital outcome. In the Acute Myocardial Infarction Hospital Registry Project II (PRIAMHO II), the female sex was an independent risk factor for worse prognosis in the group with AMI.¹⁵

TABLE 4 Thirty-day and remote outcome in men and women in the subgroups of patients with incomplete revascularization and reduced ejection fraction

Variable		Incomplete revascularization			Reduced ejection fraction		
		men, n = 186	women, n = 72	P value	men, n = 51	women, n = 19	P value
atrial fibrillation		19 (10.2)	6 (8.7)	NS	–	–	–
stroke	30-day	0 (0)	0 (0)	NS	1 (2.0)	0 (0)	NS
	total	2 (1.1)	5 (6.9)	<0.05	3 (6.0)	0 (0)	NS
AMI	30-day	2 (1.1)	1 (1.4)	NS	1 (2.0)	0 (0)	NS
	total	29 (15.7)	15 (20.8)	NS	8 (16.0)	4 (21.1)	NS
PCI	30-day	2 (1.1)	1 (1.4)	NS	1 (2.0)	0 (0)	NS
	total	38 (20.5)	21 (29.2)	NS	6 (12.0)	3 (15.8)	NS
CABG	30-day	6 (1.6)	0 (0)	NS	0 (0)	0 (0)	NS
	total	28 (15.1)	9 (12.5)	NS	2 (4.0)	1 (5.3)	NS
mortality	30-day	3 (1.6)	1 (1.4)	NS	3 (6.0)	2 (10.5)	NS
	total	18 (9.7)	9 (12.5)	NS	14 (27.5)	4 (21.1)	NS
MACEs	30-day	15 (8.1)	7 (9.7)	NS	8 (16.0)	1 (5.3)	NS
	total	96 (51.4)	41 (56.9)	NS	23 (46.0)	9 (47.4)	NS

Data are presented as number (percentage).

Abbreviations: see TABLES 1 and 2

TABLE 5 Thirty-day and remote outcome in men and women in the subgroups of patients aged 70 years or older and those with chronic kidney disease

Variable		Age, 70 years or older			Chronic kidney disease		
		men, n = 79	women, n = 62	P value	men, n = 50	women, n = 35	P value
EF <35%		–	–	–	11 (22.0)	7 (21.2)	NS
stroke	30-day	0 (0)	0 (0)	NS	1 (2.0)	0 (0)	NS
	Total	1 (1.3)	5 (8.1)	NS	2 (4.0)	6 (17.1)	<0.05
AMI	30-day	1 (1.3)	0 (0)	NS	1 (2.0)	0 (0)	NS
	total	10 (13.0)	10 (16.1)	NS	8 (16.0)	9 (25.7)	NS
PCI	30-day	1 (1.3)	0 (0)	NS	0 (0)	0 (0)	NS
	total	8 (10.4)	11 (17.7)	NS	9 (18.0)	3 (8.6)	NS
CABG	30-day	0 (0)	0 (0)	NS	0 (0)	0 (0)	NS
	total	4 (5.2)	0 (0)	NS	3 (6.0)	3 (8.6)	NS
mortality	30-day	3 (3.9)	2 (3.2)	NS	2 (4.0)	5 (14.3)	NS
	total	15 (19.0)	8 (12.9)	NS	8 (16.0)	14 (40.0)	<0.05
MACEs	30-day	4 (5.2)	6 (9.7)	NS	2 (4.0)	6 (17.1)	<0.05
	total	31 (39.0)	25 (40.3)	NS	158 (40.0)	117 (71.4)	<0.05

Abbreviations: see TABLES 1 and 2

Sielski et al.¹⁶ demonstrated that in patients with non-ST-segment-elevation MI (NSTEMI), long-term prognosis was similar for both sexes, despite the fact that invasive treatment was less frequently used in women.

Heer et al.¹⁷ assessed the outcome in patients after NSTEMI. In-hospital and long-term mortality rates were higher in women, but after the adjustment for age, the differences were not significant. Women in that study were older and were treated less frequently with clopidogrel and PCI.¹⁷

In our population, all patients were treated with PCI and clopidogrel, prehospital delay and the use of glycoprotein IIb/IIIa inhibitors were comparable between men and women in the whole population with IGT. Therefore,

those factors could not have a significant effect on the outcome. Furthermore, in our study, women in the whole IGT group were older, which did not increase mortality in this group.

There have been a number of studies reporting a greater effect of abnormalities in glucose metabolism on cardiovascular risk in women. A meta-analysis of prospective cohort studies proved that a relative risk for fatal coronary heart disease associated with concomitant diabetes was 50% higher in women than in men.¹⁸ In another study, diabetes was associated with a higher risk of death from coronary heart disease (CHD) in women than in men.¹⁹ Kranjčec et al.²⁰ analyzed patients with acute coronary syndromes. In the group with metabolic syndrome, women

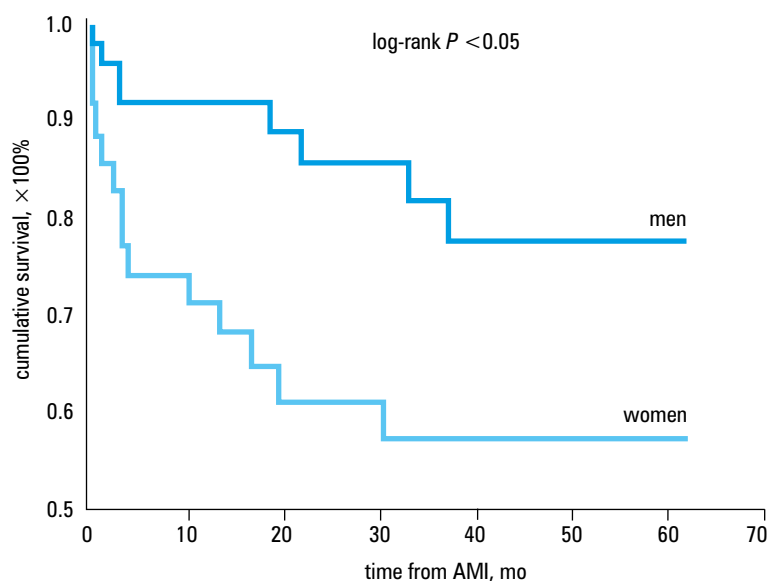


FIGURE 1 Kaplan–Meier curves of cumulative survival in men and women with impaired glucose tolerance and concomitant chronic kidney disease
Abbreviations: see TABLE 1

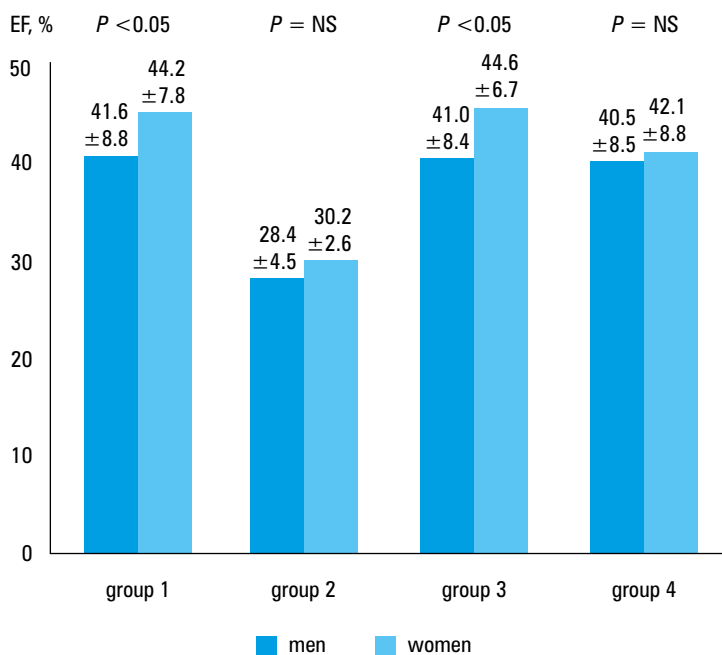


FIGURE 2 Ejection fraction in high-risk subgroups: with incomplete revascularization (group 1), reduced ejection fraction (group 2), aged 70 years or older (group 3), and chronic kidney disease (group 4)
Abbreviations: EF – ejection fraction, NS – nonsignificant

had greater MI than men (determined by peak creatine kinase levels). Patients with metabolic syndrome, particularly women, had a higher rate of heart failure.

Impaired renal function is also related to a greater risk for cardiovascular diseases. Ryan et al.²¹ demonstrated a higher risk of cardiovascular mortality with a decrease in eGFR, a marked increase was observed with an eGFR of less than 45 ml/min/1.73 m². In the Korean study, impaired renal function was an independent prognostic

factor after STEMI in both sexes, but the effect of impaired renal function on prognosis did not differ between the sexes.²² Some authors reported that advanced CKD is an independent predictor of in-hospital mortality in the group of patients undergoing PCI in the acute phase of MI.²³ It was impossible to assess in-hospital mortality in our IGT group because the OGTT was performed before discharge. Therefore, some patients died before the OGTT was done.

CKD is also a proven risk factor for ischemic stroke. In the study group of 6685 patients with chronic coronary heart disease, a quarter of patients had CKD. In this study, even mild degrees of renal dysfunction were associated with increased risk of ischemic stroke or transient ischemic attack (TIA).²⁴ Our analysis showed that an eGFR of less than 60 ml/min/1.73 m² was one of the independent risk factors for ischemic stroke (with female sex and previous stroke/TIA).

Stroke rates were higher in women within the subgroups with CKD and ICR in our study. In those high-risk groups, women were also older than men. Therefore, the effect of age could not be excluded.

Kisialiou et al.²⁵ showed that acute ischemic stroke became more frequent in women than in men after the age of 65 years.

Recently, strokes have been reported to occur in older patients. In the study of Park et al.,²⁶ the highest incidence of stroke was noted in people aged 60 and 70 years from 2003 to 2005; between 1994 and 1996, strokes occurred in younger patients.

It is not surprising that, in our study population, women were older than men. It is known that ischemic heart disease occurs earlier in men than in women.

Premenopausal women are protected by estrogens.²⁷ Vascular mechanisms may reduce abnormal vasoconstriction^{28,29} and prevent calcium influx.²⁹ Estrogen receptors are present in smooth muscle cells in human coronary arteries, thus protecting against atherosclerosis.²⁸

Our study demonstrated that there are no differences in mortality or total MACE rates between men and women with AMI treated with PCI and concomitant IGT, except for stroke rates in univariate analysis. Also, in the subgroup of patients with ICR and concomitant CKD, stroke rates were higher in women. Additionally, mortality and total MACE rates were higher in women with CKD. It cannot be excluded that higher mortality in women with IGT and CKD could be explained not only by age (women were older than men in this group), but also by a stronger effect of co-existing impaired glucose metabolism and CKD on the outcome in women. In the group of subjects without CKD selected from the Framingham Heart Study offspring cohort, IFG and IGT were associated with a higher risk for the development of CKD compared with normoglycemic subjects.¹

Elsayed et al.³⁰ assessed the effect of obesity on the risk of cardiovascular events (MI and fatal

TABLE 6 Independent risk factors for death in the whole population with impaired glucose tolerance (multivariate Cox regression)

	HR (95% CI)	P value
cardiogenic shock on admission	2.43 (1.99–2.87)	0.041
symptom duration, h	1.04 (1.03–1.05)	0.009
fibrinogen, 1 mg/dl increase	1.002 (1.001–1.003)	0.004
eGFR <60 ml/min/1.73 m ²	2.78 (2.49–3.07)	0.0004
contrast-induced nephropathy	1.81 (1.54–2.08)	0.027
TIMI <3 after PCI	2.11 (1.76–2.46)	0.032
age ≥70 years	2.18 (1.9–2.46)	0.005
multivessel coronary artery disease	2.12 (1.78–2.46)	0.028
EF <35%	2.48 (2.19–2.77)	0.001

Abbreviations: CI – confidence interval, HR – hazard ratio, others – see TABLE 1

TABLE 7 Independent risk factors for major adverse cardiovascular events and stroke in the whole population with impaired glucose tolerance (multivariate Cox regression)

Risk factors	HR (95% CI)	P value
MACEs		
male sex	0.69 (0.55–0.83)	0.009
incomplete revascularization	1.69 (1.53–1.85)	0.001
multivessel coronary artery disease	1.78 (1.59–1.97)	0.002
stroke		
male sex	0.34 (0.06–0.89)	0.048
prior stroke / TIA	6.11 (5.33–6.89)	0.020
eGFR <60 ml/min/1.73 m ²	5.79 (5.24–6.34)	0.001

Abbreviations: TIA – transient ischemic attack, others – see TABLES 1, 2, and 6

coronary heart disease) in patients with CKD. In their study, a higher waist-to-hip ratio was associated with an increased risk of cardiovascular events.

Our study shows that coexisting impaired renal function and glucose metabolism may play a great role in increasing cardiovascular and mortality risk. Further research is necessary to investigate the effect of abnormalities in glucose metabolism in patients with CKD or severe atherosclerosis, especially in women.

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Znaczenie upośledzonej tolerancji glukozy u pacjentów ze świeżym zawałem serca w zależności od płci

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SŁOWA KLUCZOWE

cukrzyca, glukoza,
ryzyko, śmiertelność,
udar

STRESZCZENIE

WPROWADZENIE Upośledzona tolerancja glukozy (*impaired glucose tolerance* – IGT) ma niekorzystny wpływ na rokowanie u pacjentów ze świeżym zawałem serca (*acute myocardial infarction* – AMI).

CELE Celem badania było porównanie wpływu IGT na wczesne i odległe rokowanie u kobiet i mężczyzn ze świeżym zawałem serca leczonym metodą przezskórnej angioplastyki wieńcowej (*percutaneous coronary intervention* – PCI).

PACJENCI I METODY Na podstawie wyników doustnego testu obciążenia glukozą, z jednoosobowego rejestru zawierającego informacje o 2733 kolejnych pacjentach leczonych z powodu AMI wyodrębniono 560 z IGT (395 mężczyzn, 165 kobiet). W całej badanej populacji oraz w obrębie podgrup o wysokim ryzyku porównano zależną od płci śmiertelność oraz główne niekorzystne zdarzenia sercowo-naczyniowe (*major adverse cardiovascular event* – MACE), obejmujące ponowny zawał, udar lub ponowną rewaskularyzację, które wystąpiły podczas hospitalizacji oraz w obserwacji odległej.

WYNIKI Śmiertelność i częstość MACE była porównywalna dla obu płci z wyjątkiem częstszego występowania udaru u kobiet (4,8 vs 1,5%; $p < 0,05$). Analogiczny brak różnic odnotowano w podgrupach pacjentów z obniżoną frakcją wyrzutową ($< 35\%$) i wśród pacjentów powyżej 70. rż., zarówno w obserwacji wczesnej jak i odległej. U kobiet, w porównaniu z mężczyznami, częściej występował udar mózgu w podgrupie pacjentów z niepełną rewaskularyzacją (6,9 vs 1,1%; $p < 0,05$) i wyższa była całkowita śmiertelność w podgrupie z niewydolnością nerek (40 vs 16%; $p < 0,05$). Płeć żeńska była niezależnym czynnikiem ryzyka wystąpienia udaru mózgu (wskaźnik ryzyka 2,94; $p = 0,048$) oraz MACE (wskaźnik ryzyka 1,45; $p = 0,009$), ale nie zgonu w populacji pacjentów z AMI i IGT.

WNIOSKI Wskaźnik śmiertelności wśród kobiet i mężczyzn ze świeżym zawałem serca leczonym metodą PCI i z towarzyszącą nietolerancją glukozy jest porównywalny, niemniej jednak płeć żeńska pozostaje niezależnym czynnikiem ryzyka wystąpienia udaru mózgu oraz złożonego punktu klinicznego jakim jest MACE, w szczególności obciążając rokowanie pacjentów z niewydolnością nerek.

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