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ARTYKUŁ ORYGINALNY / *ORIGINAL ARTICLE*

In-hospital and long-term outcomes of coronary artery bypass graft surgery in patients ≤ 45 years of age and older (from the KROK registry)

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Abstract

Background: There is a paucity of data concerning the clinical characteristics, management, and outcomes of coronary artery bypass graft surgery (CABG) in patients ≤ 45 years old.

Aim: We aimed to compare the clinical characteristics, and in-hospital and long-term outcomes of patients ≤ 45 years and > 45 years old, who underwent isolated CABG.

Methods: We identified consecutive patients who had isolated CABG in the Department of Cardiac Surgery and Transplantology in the Silesian Centre for Heart Diseases in Zabrze between January 2006 and December 2011 and were enrolled in the Polish National Registry of Cardiac Surgery Procedures (KROK registry). A total of 8196 patients were identified and split into two groups, age ≤ 45 years old (young group; n = 130) and > 45 years old (old group; n = 8066).

Results: Patients ≤ 45 years old were less often females (18.5% vs. 27.6%, p < 0.027), more often smokers (84.6% vs. 66.9%, p < 0.0001), and had a higher incidence of previous myocardial infarction (MI) (40.8% vs. 29.6%, p = 0.008). Patients ≤ 45 years old more often received only one graft (27.7% vs. 15.0%, p < 0.0001), were operated on with minimally invasive direct coronary artery bypass (MIDCAB) technique (12.3% vs. 3.9%, p < 0.0001), and had complete arterial revascularisation (55.4% vs. 18.1%, p < 0.0001). There were no significant differences between the groups regarding in-hospital mortality (0.8% vs. 1.4%, p = 0.808). Long-term outcomes revealed that young patients, compared with the older patients, showed no significant differences in the number of MI (4.6% vs. 5.6%), unstable angina (8.5% vs. 9.9%), coronary angioplasty (12.3% vs. 15.1%), reCABG (0.8% vs. 0.1%), and strokes (2.3% vs. 4.3%) during the follow-up period; long-term mortality occurred less often in the young patients (4.6% vs. 15.0%, p = 0.002).

Conclusions: We conclude that patients ≤ 45 years old requiring CABG differ from their older counterparts in clinical and surgical characteristics. We noted no significant differences in the in-hospital mortality; however, patients ≤ 45 years old had a lower mortality rate in the long-term follow-up.

Key words: young adults, surgical revascularisation, left ventricular ejection fraction, long-term follow-up

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INTRODUCTION

There is a scarcity of data in contemporary literature concerning early and long-term results of coronary artery bypass graft (CABG) surgery in young patients [1–4]. Probably it is a consequence of the increasing role of percutaneous coronary intervention (PCI) in recent years. The majority of patients requiring coronary revascularisation at a young age are treated due to acute coronary syndromes, in which recommendations for PCI are quite clear and for CABG not so evident [5–7]. Patients undergoing CABG at a young age are generally not a numerous cohort [1, 8–12], with aggressive atherosclerosis in which the abilities of pharmacotherapy and invasive cardiology have often been exhausted. Most young adults characteristically have suffered a myocardial infarction (MI) and have undergone previous PCI before CABG surgery [2, 10, 11, 13–15].

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Notwithstanding, the number of studies regarding the early and long-term results of surgical revascularisation in this group is limited [1, 2, 8, 9, 11–19]. Available papers come mainly from the last three decades of the twentieth century when indications for CABG and the efficacy of PCI were not what they are today [9–13, 16–21].

The aim of our study was the comparison of the clinical characteristics, and early and long-term results of all consecutive patients 45 years old and younger (≤ 45 years) with older (> 45 years) patients who had isolated CABG at the Department of Cardiac Surgery and Transplantology at the Silesian Centre for Heart Diseases in Zabrze, Poland and were enrolled in the Polish National Registry of Cardiac Surgery Procedures — KROK registry.

METHODS

Design of the registry

All data were collective in a retrospective matter from the KROK registry. The KROK registry is an ongoing, nationwide, multicentre registry of cardiac surgery procedures in Poland. The registry is a joint initiative of the Polish Society of Cardiothoracic Surgeons and the Polish Ministry of Health. The registry commenced in 2006 and collects data from all the cardiac surgery centres in Poland. Centres enrolling patients in the KROK registry are required to transfer the data concerning every cardiac surgery to the central database in the National Centre for Healthcare Information Systems at the Ministry of Health. Our pilot study involved patients treated in the Department of Cardiac Surgery and Transplantology at the Silesian Centre for Heart Diseases between January 2006 and December 2011 and were enrolled into the KROK registry. Follow-up data regarding the number of deaths, MIs, hospitalisations due to unstable angina (UA), subsequent revascularisations, and strokes were obtained from the National Health Fund — the nationwide, obligatory, public health insurance institution in Poland. The long-term follow-up data were available only for Silesian province inhabitants, thereby only these patients were enrolled to the analysis.

Definitions of individual risk factors were as follows: cigarette smoking — current or stopped < one year; hypertension — systolic blood pressure > 140 mm Hg and/or diastolic blood pressure > 90 mm Hg and/or on anti-hypertensive treatment, hypercholesterolaemia — total cholesterol > 200 mg/dL (5.2 mmol/L) and/or a low-density lipoprotein cholesterol level of > 130 mg/dL (3.4 mmol/L) or previously diagnosed and treated hypercholesterolaemia; diabetes mellitus — fasting glucose > 125 mg% (7.0 mmol/L) or normal on hypoglycaemic therapy, and a random plasma glucose level of > 200 mg/dL (11.1 mmol/L); obesity — body mass index (BMI) ≥ 30 kg/m^2. Renal failure was diagnosed if serum creatinine level exceeded 80 μmol/L in females and 106 μmol/L in males. Coronary angiography was conducted in all patients before surgery. Significant disease was defined as a reduction in arterial lumen diameter of at least 70%. A stenosis of 50% or more in the left main coronary artery was considered significant.

The patients were divided into two groups: 45 years old or less (young) and > 45 years old (older). Differences in the clinical and operative characteristics were analysed. We then compared the in-hospital and long-term outcomes, including the number of deaths, MIs, hospitalisations due to UA, subsequent coronary revascularisations, and strokes during the follow-up period.

Statistical analysis

The continuous variables were presented as the means and standard deviations. The categorical variables were presented as percentages. We used the χ^2, Mann-Whitney U, and Student t tests as appropriate to test for differences between the patients aged ≤ 45 and > 45 years. The association between the age group and long-term follow-up including mortality was analysed using the Kaplan-Meier method with log-rank testing. To find the predictors of late mortality, 24 clinical and operative variables were tested by means of univariate analysis. To identify the independent predictors of long-term outcome, for all the patients who survived CABG, both univariate and multivariate Cox regression analysis was performed using a hierarchical forward with switching procedure. For all analyses, a two-tailed p-value ≤ 0.05 was considered as significant. The hazard ratios (HR) and 95% confidence intervals (CI) were calculated. The analyses and graphs were performed/drawn using Statistica 12 (StatSoft Inc., Tulsa, USA).

RESULTS

A total of 8196 patients were identified and included in the analysis. Only 130 (1.6%) patients were young (≤ 45 years old). The baseline demographic and clinical characteristics of the young patients compared to the older patients are shown in Table 1. The young patients were more often smokers ($p < 0.0001$) and had a higher incidence of previous MI ($p = 0.008$). Diabetes mellitus, hypertension, peripheral vascular disease (PVD), and renal failure were significantly more frequent in the older patients. As far as operative characteristics are concerned, the patients ≤ 45 years old more often received only one graft ($p < 0.0001$), were more frequently operated with minimally invasive direct coronary artery bypass (MIDCAB) technique, and more often had complete arterial revascularisation ($p < 0.0001$) (Table 2). There were no significant differences between the groups in regard to in-hospital outcomes (Table 2). In regard to long-term outcomes, the young patients compared with the older had a lower mortality rate ($p = 0.002$) (Fig. 1) without significant differences in the number of MIs, UA, coronary reinterventions or strokes during the follow-up period (Table 3). Amongst 24 variables of univariate analysis only two were statistically significant predictors of the late mortality in the young group: per 5% decrease of left ventricular ejection fraction (LVEF), and

Table 1. Baseline demographic and clinical characteristics of the study groups

	≤ 45 years (n = 130)	> 45 years (n = 8066)	p
Age [years]	41.8 ± 3.7	64.6 ± 8.4	< 0.0001
Female gender	24 (18.5%)	2224 (27.6%)	0.03
Previous MI	53 (40.8%)	2389 (29.6%)	0.008
Previous PCI	51 (39.2%)	2708 (33.6%)	0.21
Previous CABG	0 (0%)	33 (0.4%)	0.97
Smoking	110 (84.6%)	5395 (66.9%)	< 0.0001
Hypercholesterolaemia	90 (69.2%)	5057 (62.7%)	0.15
Diabetes mellitus	21 (16.2%)	2700 (33,5%)	< 0.0001
Obesity	43 (33.1%)	2476 (30.7%)	0.63
Hypertension	89 (68.5%)	6787 (84.1%)	< 0.0001
PVD	11 (8.5%)	1537 (19.1%)	0.003
Renal failure	1 (0.8%)	433 (5.4%)	0.03
Sinus rhythm	127 (97.7%)	7141 (88.5%)	0.002
Preoperative LVEF	49.4 ± 9.3	49.4 ± 9.3	0.59
LVEF < 40%	11 (8.5%)	973 (12.1%)	0.26
LM stenosis	20 (15.4%)	2162 (26.8%)	0.005
Cardiogenic shock	1 (0.8%)	21 (0.3%)	0.79

Values presented as means ± standard deviation or number and percentage of subjects; CABG — coronary artery bypass grafting; LM — left main; LVEF — left ventricular ejection fraction; MI — myocardial infarction; PCI — percutaneous coronary intervention; PVD — peripheral vascular disease

LVEF < 40% (Table 4). In the older group half of the 24 variables proved to be significant predictors of late death (Table 5). Subsequent multivariate regression analysis showed that the only independent predictor of late mortality in the patients ≤ 45 years old was per 5% decrease of LVEF (Fig. 2). In the older group, independent predictors of long-term mortality were: per five years increase of age, previous MI, smoking, diabetes mellitus, PVD, renal failure, per 5% decrease of LVEF, and left main stenosis (Fig. 2).

DISCUSSION

In the literature, the definition of young age differed among studies and ranged from 35 to 50 years [1, 2, 4,9, 10–13, 15, 17, 19–23]. In the older papers, young adults involved patients 35 or 40 years old and younger [9–13, 15, 17, 18, 21]. In the more recent studies age 45 [16, 23] and even 50 years [4] was the criterion of young age. This trend is probably a consequence of the decreasing number of young patients requiring CABG in recent years. In the analysis by Cosgrove et al. [22] patients under 40 years old compromised 4.9% of all patients who underwent CABG between 1971 and 1978. In our material, young adults aged 45 years or less comprised only 1.6% of all patients who underwent surgical revascularisation in 2006–2011. To obtain a good number of patients in our study we chose to define young patients as age ≤ 45 years.

Young adults requiring CABG differ from their older counterparts in several aspects. One of them is the prominent

Table 2. Operative characteristics and intra-hospital complication of the study groups

	≤ 45 years (n = 130)	> 45 years (n = 8066)	p
Number of grafts:			
1 graft	36 (27.7%)	1207 (15.0%)	< 0.0001
2 grafts	49 (36.2%)	3124 (38.7%)	0.89
≥ 3 grafts	45 (33.9%)	3735 (46.3%)	0.012
Type of surgery:			
CABG	44 (33.9%)	3010 (37.3%)	0.47
OPCAB	62 (47.7%)	4616 (57.2%)	0.04
MIDCAB	16 (12.3%)	314 (3.9%)	< 0.0001
EACAB	6 (4.6%)	80 (1.0%)	< 0.0001
Hybrid revascularisation	2 (1.5%)	46 (0.6%)	0.39
Type of revascularisation:			
Complete arterial	72 (55.4%)	1460 (18.1%)	< 0.0001
Arterial and venous	50 (38.5%)	5680 (70.4%)	< 0.0001
Intra-hospital complications:			
Reoperation	7 (5.4%)	346 (4.3%)	0.69
Perioperative MI	1 (0.8%)	62 (0.8%)	0.61
Dialysis	1 (0.8%)	84 (1.0%)	0.89
LV support	3 (2.3%)	254 (3.2%)	0.77
Death	1 (0.8%)	114 (1.4%)	0.81

Values presented as number and percentage of subjects; CABG — coronary artery bypass grafting; EACAB — endoscopic atraumatic coronary artery bypass; MI — myocardial infarction; MIDCAB — minimally invasive direct coronary artery bypass grafting; LV — left ventricular; OPCAB — off-pump coronary artery bypass grafting

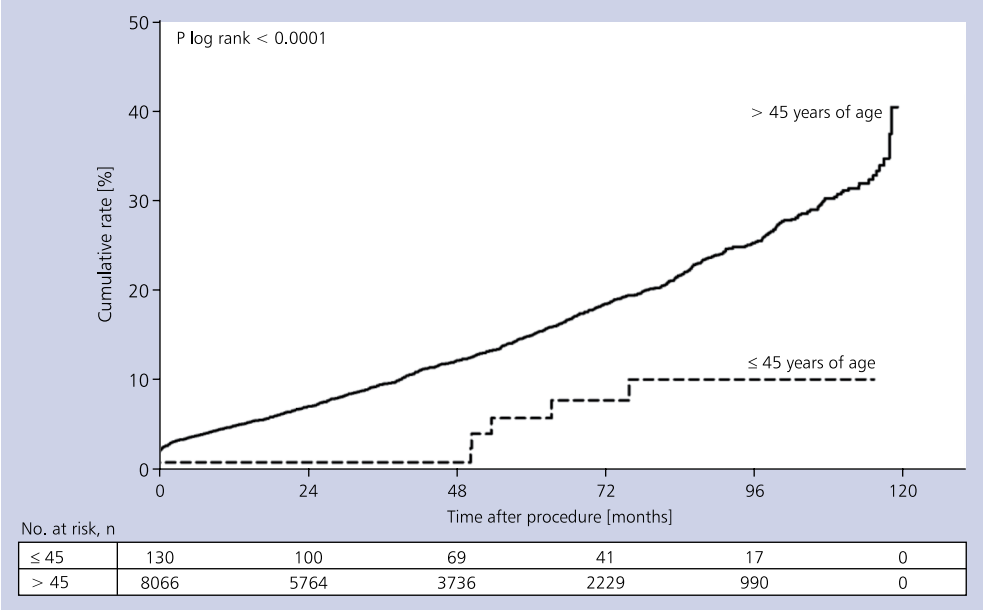

Figure 1. Kaplan-Meier analysis of the long-term survival in patients after coronary artery bypass grafting stratified by age

Table 3. Long-term results of the study groups

	≤ 45 years (n = 130)	> 45 years (n = 8066)	p
Follow-up [months]	53.1 ± 33.3	49.3 ± 33.6	0.178
Percutaneous coronary intervention	16 (12.3%)	1214 (15.1%)	0.456
Coronary artery bypass grafting	1 (0.8%)	9 (0.1%)	0.387
Myocardial infarction	6 (4.6%)	448 (5.6%)	0.786
Unstable angina	11 (8.5%)	797 (9.9%)	0.696
Stroke	3 (2.3%)	344 (4.3%)	0.379
Death	6 (4.6%)	1207 (15.0%)	0.002

Values presented as means ± standard deviation or number and percentage of subjects

prevalence of male gender amongst patients undergoing surgery at a young age. In some analysis men exceeded 90% of the total population [1, 13]. Secondly, young patients differ as to the presence of certain risk factors; they usually have an increased incidence of smoking, hypercholesterolaemia, and positive family history of coronary artery disease (CAD) [9–11, 13, 17–21, 24]. The incidence of smoking in young patients varied by country, exceeding in some papers 90% [9, 10, 15, 24]. In our analysis, smokers comprised nearly 85% of the young patients. The second frequent risk factor in our study was hypercholesterolaemia, noted in 69.2% of the young adults, but without a significant difference in comparison to the older group. It must be noted that the incidence of hypercholesterolaemia in young adults is differential, ranging from 37.0% to 90.4% according to the criteria used as the cut-off — a cut-off which varies from 200 mg/dL to 300 mg/dL [13, 15, 20]. In an analysis by Ng et al. [20] 90% of patients had cholesterol level above 200 mg/dL. French et al. [17] found the cholesterol level to be > 250 mg/dL in 65.0% of patients. Consistent with other studies [13, 16], we noted a higher incidence of hypertension and diabetes mellitus among the older patients compared to their younger counterparts.

In studies assessing the long-term results of CABG in young patients the prognosis is often unfavourable [11, 13, 18, 19]. Kelly et al. [18] documented a recurrence rate of anginal symptoms amounting to 37.5% during a seven-year follow-up period in patients who had surgery at 40 years of age and younger. Further comparing to patients who had CABG at the mean age of 53.9 years, young patients had a three-times higher recurrence rate of angina, and a 14-fold increased risk of repeated surgical revascularisation. In another analy-

Table 4. Univariate analysis of potential variables influencing on the long-term mortality in the group of patients aged ≤ 45 years

	Dead (n = 6)	Survived (n = 124)	HR	95% CI	p
Age (per 5-year increase)	42.0 ± 3.4	41.8 ± 3.8	1.01	0.31–3.30	0.98
Female gender	2 (33.3%)	22 (17.7%)	2.22	0.41–12.15	0.36
Previous MI	5 (83.3%)	48 (38.7%)	2.59	0.28–23.55	0.39
Previous PCI	3 (50.0%)	48 (38.7%)	1.44	0.29–7.13	0.66
Previous CABG	0 (0%)	0 (0.0%)	–	–	–
Smoking	4 (66.7%)	106 (85.8%)	0.32	0.06–1.76	0.19
Hypercholesterolaemia	2 (33.3%)	88 (71.0%)	0.31	0.06–1.70	0.18
Diabetes mellitus	1 (16.7%)	20 (16.1%)	1.04	0.12–8.87	0.97
Obesity	3 (50.0%)	40 (32.3%)	1.37	0.27–6.82	0.70
Hypertension	3 (50.0%)	86 (69.4%)	0.66	0.13–3.27	0.61
PVD	1 (16.7%)	10 (8.1%)	1.34	0.16–11.58	0.79
Renal failure	0 (0.0%)	1 (0.8%)	–	–	–
Sinus rhythm	6 (100.0%)	121 (97.6%)	–	–	–
Preoperative LVEF (per 5% decrease)	31.0 ± 19.3	49.8 ± 8.6	2.10	1.28–3.46	0.003
LVEF < 40%	2 (33.3%)	9 (7.3%)	6.05	1.11–33.09	0.04
LM stenosis	1 (16.7%)	19 (15.3%)	1.51	0.18–13.02	0.71
Cardiogenic shock	1 (16.7%)	0 (0.0%)	–	–	–
1 graft	1 (16.7%)	35 (28.2%)	1.00	–	–
2 grafts	4 (66.7%)	45 (36.3%)	2.62	0.29–23.61	0.39
≥ 3 grafts	1 (16.7%)	44 (35.5%)	0.73	0.05–11.69	0.82
CABG	3 (50.0%)	41 (33.1%)	1.00	–	–
OPCAB	3 (50.0%)	59 (47.6%)	1.19	0.24–5.97	0.83
Complete arterial revascularisation	3 (50.0%)	69 (55.7%)	0.79	0.16–3.90	0.76
Arterial and venous revascularisation	2 (33.3%)	52 (41.9%)	0.69	0.13–3.79	0.67

Values presented as means ± standard deviation or number and percentage of subjects; CABG — coronary artery bypass grafting; CI — confidence interval; HR — hazard ratio; LM — left main; LVEF — left ventricular ejection fraction; MI — myocardial infarction; PCI — percutaneous coronary intervention; PVD — peripheral vascular disease; OPCAB — off-pump coronary artery bypass grafting

sis Rohrer-Gubler et al. [13] noted that progression of CAD, defined as the need for re-intervention (PCI or CABG), was three-times faster in patients who had surgery before 40 years of age compared with patients who underwent surgery at a mean age of 64.2 years. In an analysis by Cosgrove et al. [22] age < 40 years was found to be the most important predictor of potential for reoperation in patients after CABG (χ^2 71.6, $p < 0.0001$). Cohen et al. [11] compared long-term results of CABG in patients aged under 36 years, 45 to 59 years, and 60 years and over. Event-free survival was significantly worse in the young group (37%) vs. the middle-aged group (61%, $p < 0.01$) and vs. the elderly group (59%, $p < 0.02$).

The unsatisfactory long-term results of surgical revascularisation in young adults are probably explained by the presence of the aggressive nature of atherosclerosis present in these patients — a higher percentage of previous MI and PCIs before CABG surgery, observed also in our study, seem to confirm this [10, 11, 13, 25]. De Olivera et al. [14] showed that 78.2% of patients less than 35 years old had MI before surgery.

In our study, we did not observe a worse outcome in the young patients, contrary to what is seen in other papers [11, 13, 18, 22]. It is worth emphasising that the young patients compared to older patients less frequently had multi-vessel disease, and more often required only one graft and obtained complete arterial revascularisation. They less frequently had diabetes, renal failure, left main stenosis, or PVD. Thereby, one would expect better long-term outcomes in these "less sick" patients in comparison to the older group. Despite this, we did not document a significant difference between both groups regarding the need of revascularisation, incidence of MI, UA, and stroke during the follow-up period, which indirectly may confirm the aggressive nature of atherosclerosis in this group. The only significant difference was noted in the long-term mortality rate in favour the younger group but there was over 23 years disparity in the mean age between both groups and the per-five-year increase of age was revealed to be one of the strongest predictors of death in the older group in the multivariate analysis.

Table 5. Univariate analysis of potential variables influencing on the long-term mortality in the group of patients aged > 45 years

	Dead (n = 1207)	Survived (n = 6859)	HR	95% CI	p
Age (per 5 years increase)	67.4 ± 8.2	64.2 ± 8.3	1.33	1.29–1.38	< 0.0001
Female gender	318 (26.4%)	1906 (27.8%)	0.97	0.86–1.11	0.68
Previous MI	591 (49%)	1798 (26.2%)	1.29	1.15–1.45	< 0.0001
Previous PCI	375 (31.1%)	2333 (34.0%)	0.87	0.77–0.99	0.03
Previous CABG	8 (0.7%)	25 (0.4%)	2.05	1.02–4.11	0.04
Smoking	851 (70.5%)	4544 (66.3%)	1.15	1.02–1.31	0.02
Hypercholesterolaemia	642 (53.2%)	4415 (64.4%)	0.86	0.77–0.97	0.01
Diabetes mellitus	472 (39.1%)	2228 (32.5%)	1.33	1.18–1.49	< 0.0001
Obesity	342 (28.3%)	2134 (31.1%)	0.90	0.80–1.02	0.10
Hypertension	1016 (84.2%)	5771 (84.1%)	1.20	1.03–1.40	0.02
PVD	366 (30.3%)	1171 (17.1%)	1.35	1.19–1.52	< 0.0001
Renal failure	79 (6.6%)	354 (5.2%)	2.41	1.91–3.04	< 0.0001
Sinus rhythm	1042 (86.3%)	6099 (88.9%)	0.64	0.54–0.75	< 0.0001
Preoperative LVEF (per 5% decrease)	45.0 ± 10.0	49.5 ± 9.0	0.81	0.79–0.83	< 0.0001
LVEF < 40%	246 (20.4%)	727 (10.6%)	2.15	1.87–2.48	< 0.0001
LM stenosis	410 (34.0%)	1752 (25.5%)	1.30	1.15–1.47	< 0.0001
Cardiogenic shock	10 (0.8%)	11 (0.2%)	3.79	2.04–7.07	< 0.0001
1 graft	186 (15.4%)	1021 (14.9 %)	1.00	–	–
2 grafts	457 (37.9%)	2667 (38.9%)	0.90	0.76–1.07	0.22
≥ 3 grafts	564 (46.7%)	3171 (46.2%)	0.85	0.72–1.00	0.05
CABG	494 (40.9%)	2516 (36.7%)	1.00	–	–
OPCAB	670 (55.5%)	3946 (57.5%)	1.18	1.05–1.33	0.007
Complete arterial revascularisation	193 (16.0%)	1299 (18.9%)	0.86	0.74–1.00	0.05
Arterial and venous revascularisation	856 (70.9%)	5037 (73.4%)	0.82	0.72–0.92	0.001

Values presented as means ± standard deviation or number and percentage of subjects; CI — confidence interval; CABG — coronary artery bypass grafting; HR — hazard ratio; LM — left main; LVEF — left ventricular ejection fraction; MI — myocardial infarction; PCI — percutaneous coronary intervention; PVD — peripheral vascular disease; OPCAB — off-pump coronary artery bypass grafting

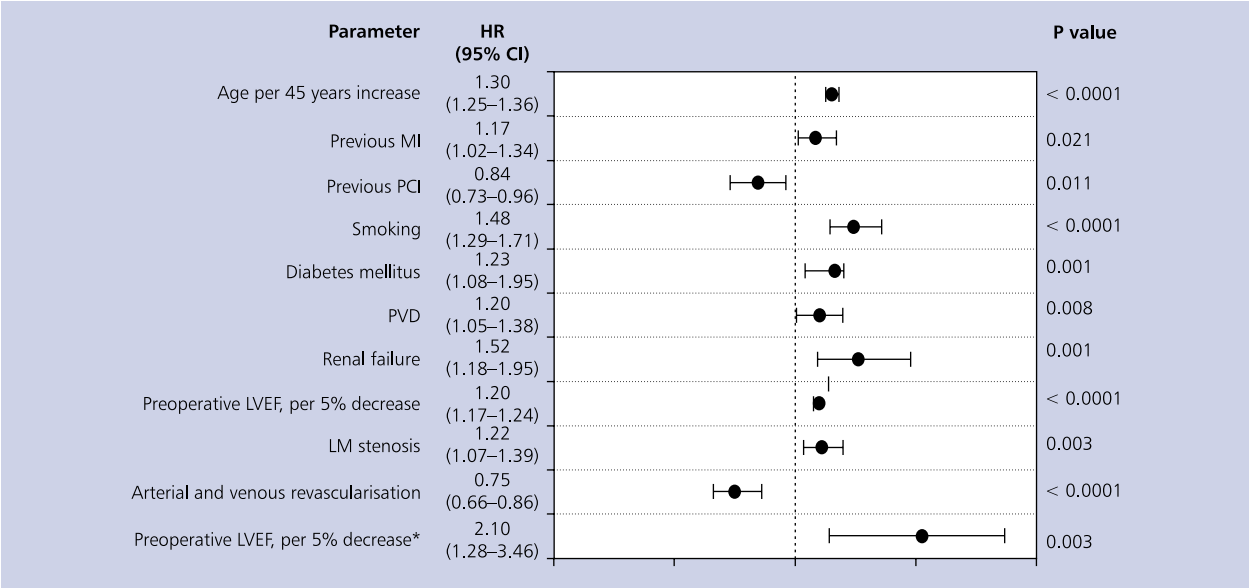

Figure 2. Predictors of long-term mortality in the older and younger (*) groups (Cox proportional hazards model results); CI — confidence interval; HR — hazard ratio; LM — left main; LVEF — left ventricular ejection fraction; MI — myocardial infarction; PCI — percutaneous coronary intervention; PVD — peripheral vascular disease

Another predictor of poor prognosis was impaired LVEF. Univariate analysis showed in both groups that a 5% decrease of preoperative LVEF and LVEF < 40% were both predictors of long-term mortality. Moreover, in multivariate regression analysis 5% decrease of preoperative LVEF was revealed to be an independent predictor of late mortality in both groups. Formica et al. [25] in their analysis of patients who underwent total arterial myocardial revascularisation demonstrated in multivariate analysis that LVEF ≤ 40% was a predictive factor of cardiac deaths (HR 0.78; 95% CI 0.59–1; p = 0.07) and cardiac events (HR 0.43; 95% CI 0.18–1.02; p = 0.04) [25]. Rohrer-Gubler et al. [13] showed in their multivariate regression analysis that preoperative LVEF of less than 45% was one of the significant independent predictor of late mortality. An improvement in the long-term outcomes of CABG among young adults has also been observed over the last few years. In another publication published 10 years later, concerning patients who had CABG ≤ 40 years, five-year survival was 92% [13]. In our material, the mortality among young adults was only 4.6% nearly 4.5 years after discharge. Progress in long-term outcomes is related to an improvement in surgical techniques, pharmacotherapy, and invasive cardiology. Use of arterial revascularisation is recommended especially in young patients with aggressive atherosclerosis, and it improves long-term results [10, 13, 23, 26]. Sajja et al. [23] analysed patients who had primary CABG mainly using venous grafts before the age of 45 years and required reoperation in the long-term follow-up period. The recurrence of angina was a consequence of graft failure or progression of disease in native vessels. The number of grafts was 2.5 per patient at primary surgery and 3.1 at reoperation, which confirms progression of atherosclerosis in native arteries and failure of vein grafts in this group of patients [23]. In our material 55.4% of young patients obtained complete arterial revascularisation compared to 18.1% of older patients.

Limitations of the study

There are some limitations in our analysis. First of all, our study involved a relatively small number of the young patients aged ≤ 45 years (n = 130). The retrospective design of the analysis was associated with the selection bias and other consequences. We focused on patient characteristics and general outcomes of CABG in both cohorts; therefore, we did not analyse the surgical aspects of the treatment. Finally, we did not compare both groups using SYNTAX score, which is now routinely reported in our institution.

CONCLUSIONS

Our results showed that patients ≤ 45 years old requiring CABG differ from their older counterparts in clinical and surgical characteristics. We did not note any significant differences in the in-hospital outcomes with a lower mortality rate in the young group in the long-term follow-up.

Conflict of interest: *none declared*

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Wewnątrzszpitalne i odległe wyniki pomostowania tętnic wieńcowych u chorych w wieku ≤ 45 lat i starszych (na podstawie Krajowego Rejestru Operacji Kardiochirurgicznych — KROK)

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Streszczenie

Wstęp: Niewiele jest prac oceniających charakterystykę kliniczną i wyniki pomostowania tętnic wieńcowych (CABG) u chorych w wieku ≤ 45 lat.

Cel: Celem niniejszej pracy było porównanie charakterystyki klinicznej oraz wczesnych i odległych wyników izolowanego zabiegu CABG u chorych w wieku ≤ 45 lat i starszych.

Metody: Do badania włączono kolejnych pacjentów leczonych w Katedrze i Oddziale Klinicznym Kardiochirurgii i Transplantologii Śląskiego Centrum Chorób Serca w Zabrzu, u których w okresie od stycznia 2006 r. do grudnia 2011 r. wykonano CABG i włączono do Krajowego Rejestru Operacji Kardiochirurgicznych (KROK). Spośród ogólnej liczby 8196 operowanych, chorych podzielono na dwie grupy: w wieku ≤ 45 lat (grupa młodych; n = 130) i > 45 lat (grupa starszych; n = 8066).

Wyniki: Wśród chorych operowanych w wieku ≤ 45 lat mniej było kobiet (18,5% *vs*. 27,6%; p < 0,027), więcej było osób palących tytoń (84,6% *vs*. 66,9%; p < 0,0001) i częściej stwierdzano w tej grupie przebyty zawał serca (MI) w wywiadzie (40,8% vs. 29,6%; p = 0,008). Chorzy ≤ 45 lat częściej byli operowani z użyciem tylko jednego zespolenia (27,7% *vs*. 15,0%; p < 0,0001), z wykorzystaniem techniki małoinwazyjnej (MIDCAB) (12,3% *vs*. 3,9%, p < 0,0001) oraz otrzymywali pełną rewaskularyzację tętniczą (55,4% vs. 18,1%, p < 0,0001). Nie stwierdzono istotnej różnicy między obydwiema grupami w zakresie wewnątrzszpitalnej śmiertelności (0,8% *vs*. 1,4%; p = 0,808). W okresie obserwacji odległej między pacjentami młodymi i starszymi nie zanotowano istotnej różnicy w częstości występowania MI (4,6% *vs*. 5,6%), niestabilnej dławicy (8,5% *vs*. 9,9%), angioplastyki wieńcowej (12,3% *vs*. 15,1%), ponownego zabiegu CABG (0,8% *vs*. 0,1%) i udarów mózgu (2,3% *vs*. 4,3%). Odnotowano natomiast niższą śmiertelność odległą w grupie chorych młodych (4,6% *vs*. 15,0%; p = 0,002).

Wnioski: Pacjenci w wieku ≤ 45 lat poddani CABG różnią się od osób starszych pod względem charakterystyki klinicznej i operacyjnej. Choć nie odnotowano między obydwiema grupami istotnych różnic w zakresie śmiertelności wewnątrzszpitalnej, to pacjenci w wieku ≤ 45 lat charakteryzowali się niższą śmiertelnością w okresie obserwacji odległej.

Słowa kluczowe: młodzi dorośli, chirurgiczna rewaskularyzacja, frakcja wyrzutowa lewej komory, obserwacja odległa

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