Change in the clinical profile of patients referred for coronary artery bypass grafting from 2004 to 2008. Trends in a single-centre study

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Abstract

Background and aims: The aim of this study is to describe the changes that occurred between 2004 and 2008 in the profile of patients referred for off-pump surgical treatment of coronary artery disease, by determining changes in their clinical characteristics, surgical procedures, and their results.

Methods and results: This study is a retrospective evaluation of 2827 consecutive patients treated in the units of the 1st Chair of Cardiology of the Medical University of Warsaw from 2004 to 2008. We identified and retrieved 133 preoperative, intra-operative, and postoperative parameters. The statistical analysis was performed on measurable data in the analysed subgroups, but the relationship between immeasurable data was also examined. Significant declines in duration of hospitalisation, systolic and diastolic blood pressure on admission, left ventricular ejection fraction, stable coronary disease on admission, relationship between venous and arterial conduits used as graft, and in-hospital infections were observed. Meanwhile, the prevalence of arterial hypertension, of chronic pulmonary diseases, smoke, neurological dysfunction, heart rate on admission, diagnosis of two- and three-vessel disease and acute coronary syndrome/unstable angina, additive and logistic EuroScore, and average number of postoperative days in intensive care unit increased. More operations were performed as urgent/emergency cases, with higher numbers of grafts — which were more often arterial — per patient. An increase of length of the operation, blood loss and need for transfusion were observed as well as increased need for reoperation for bleeding.

Conclusions: Patients referred for coronary artery surgery are becoming higher-risk patients with a greater number of comorbidities, and surgical techniques are becoming progressively more sophisticated.

Key words: coronary artery bypass grafting, coronary artery disease, comorbidities, epidemiology

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INTRODUCTION

Cardiovascular diseases are the leading cause of death in developed countries and represent approximately 29% of all deaths [1]. In the United States every sixth death in 2008 was associated with coronary artery disease (CAD) [2]. In Poland a tendency for a slight decrease in cardiovascular diseases mortality has been observed, from 52% of all deaths in 1990 to 46% in 2011 [3]. The reason for the observed declining mortality from CAD can be seen in higher accessibility to invasive procedures and more common treatment with acetylsalicylic acid, beta-blockers, angiotensin-converting enzyme inhibitors, and statins [4, 5]. Undoubtedly, it is also a success of cardiac scientific societies, which constantly promote the knowledge concerning CAD risk factors.

Percutaneous coronary intervention (PCI) is nowadays a method of revascularisation of significant importance; however, it changed the clinical profile of patients referred for cardiac surgery. On the other hand, coronary artery bypass grafting operation (CABG) remains the only option for patients with complex CAD and high risk [6].

The aim of this study is to describe changes in the clinical profile of patients referred for CABG, determining progression in their clinical characteristics, surgical procedures, and results of in-hospital treatment from 2004 to 2008.

METHODS
Study population

This study is a retrospective, cross-sectional evaluation of all surgical patients treated in the units of the 1st Chair of Cardiology of the Medical University of Warsaw from 2004 to 2008. The analysis was conducted on data collected from medical records of patients. Inclusion criteria were: CAD patients with surgical indication, off-pump CABG (OPCAB) through median sternotomy, and the same surgeon. Exclusion criteria were: combined procedures (operations different from isolated CABG) and conversion to surgery with cardiopulmonary bypass.

Data elements

Parameters were collected in a Microsoft Excel 2007 database according to subgroups planned for the need of a study. The population data included: age, sex, height, body weight, and length of stay in intensive care and total length of hospitalisation. CAD risk factors were defined as diseases that have a proven association with CAD, such as: arterial hypertension, disorders of carbohydrate metabolism, chronic kidney disease (CKD), and active and past smoking. Past smoking was defined as cessation for at least two weeks before surgery. Additionally, the analysis included co-occurrence of other diseases with a negative impact on the outcome, such as: chronic pulmonary diseases (CPD), extracardiac arteriopathy, neurological dysfunction severely affecting day-to-day functional activity (ND), serum creatinine concentration > 2.3 mg/dL preoperatively, and previous cardiac surgery requiring opening of the pericardium. Additionally, the prevalence of single-, double-, and triple-vessel disease, left ventricular ejection fraction (EF), body mass index (BMI), body surface area (BSA), additive and logistic EuroScore, type of CAD (stable/unstable/acute coronary event), mode of operation, duration of the operation, and the number and type of grafts were analysed. To assess the early results of treatment, we analysed perioperative variables such as: sudden cardiac arrest, ventricular fibrillation/ventricular tachycardia, asystole/pulseless electrical activity, stroke, blood loss in the first 24 h (mL), amount of transfused packed red blood cells (PRBC), need for resternotomy, respiratory failure, dialysis, infections, postoperative atrial fibrillation (AF), intra-aortic balloon pump (IABP) (before, during, and after CABG), and in-hospital mortality.

Definitions

"Accelerated" mode was defined as the transfer of the patient to the Department of Cardiac Surgery directly from another clinic/cardiology ward without discharging from the hospital. To determine this mode of operation discharge letters from clinics/cardiology wards from which the patient was transferred for surgery were verified. Such an approach refers to lower mortality in this group of patients, in whom it is possible to postpone operations [7]. Another introduced term is "disorder of carbohydrate metabolism". This state occurs when blood glucose is greater than 200 mg/dL; however, this condition is not necessarily associated with the diagnosis of diabetes and can appear physiologically in the acute phase of myocardial infarction [8]. CKD was defined solely by estimation of glomerular filtration rate < 60 mL/min per 1.73 m².

Statistical analysis

The results are presented as mean ± standard deviation. The χ^2 test of independence was used for comparison of the frequency of occurrence of measurable data in the analysed subgroups, and to examine the relationship between immeasurable data. Statistical analysis was performed with the software STATISTICA 10. Statistical significance was determined at the level of p < 0.05.

RESULTS

From 2004 to 2008 a total of 2827 consecutive patients were hospitalised in the Department of Cardiac Surgery of the Medical University of Warsaw. Finally the retrospective audit included 1253 patients after exclusion of patients who underwent operations different from CABG (23.88%), combined procedures (7.41%), OPCAB (3.76%), or those who did not meet other criteria for inclusion in the study (19.2%) (Fig. 1).
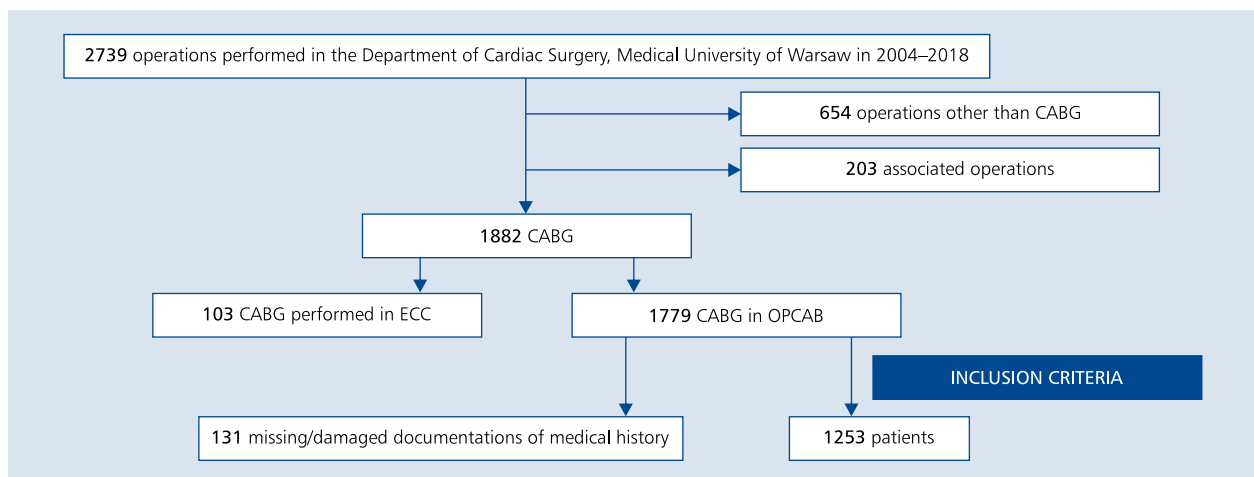
Characteristics of patients

Between 2004 and 2008 there was a small but significant increase of BMI (p < 0.05), while BSA was constant (p < 0.05). The most frequently met comorbidities were: arterial hypertension (p < 0.001), CPD (p < 0.05), ND (p < 0.01), and active tobacco smoking (p < 0.01). Moreover, a significant increase of the risk for surgical mortality evaluated by additive (p < 0.001) and logistic EuroScore (p < 0.001) was observed. However, the duration of hospitalisation was significantly shorter (p < 0.001), but the average number of days in the postoperative intensive care unit increased (p < 0.001) (Table 1, Fig. 2).

On admission the following parameters were found to be significant: higher heart rate (p < 0.001), lower systolic blood pressure (p < 0.001), lower diastolic blood pressure (p < 0.01), and lower mean EF value (p < 0.001), less single-vessel disease, but more two- and three-vessel disease (p < 0.001) (Figs. 3, 4). The most commonly affected vessel in single-vessel disease was left anterior descending artery (94.22%), less often left marginal artery (3.56%), and least often diagonal branch of the left anterior descending artery (2.22%) (Figs. 3A, 4).

Changes in intraoperative parameters

Fewer patients were operated with stable CAD, more often with acute coronary syndrome (ACS)/unstable angina (p < 0.001). Therefore, the percentage of operations performed as elective declined; meanwhile, the the proportion of urgent (p < 0.001)/emergency (p < 0.001) surgeries increased. Use of vein grafts decreased (p < 0.001), while arterial conduits were employed more frequently (left internal mammary artery [p < 0.01], right internal mammary artery

Figure 1. Enrolment and exclusion criteria; CABG — coronary artery bypass graft; OPCAB — off-pump CABG; ECC — extracorporeal circulation

Table 1. Characteristics of the population

Parameter	Year					P
	2004	2005	2006	2007	2008	
Sex (men)	206 (72.8%)	242 (74.0%)	214 (77.5%)	141 (68.5%)	121 (75.2%)	> 0.05
Age [years]	64.3 ± 9.82	65.8 ± 9.27	65.4 ± 9.56	66.0 ± 9.62	66.5 ± 9.77	> 0.05
Body mass index [kg/m²]	27.9 ± 3.95	28.0 ± 4.75	28.4 ± 4.38	28.1 ± 4.51	27.2 ± 4.43	< 0.05
Body surface area [m²]	1.904 ± 0.18	1.903 ± 0.20	1.939 ± 0.19	1.895 ± 0.20	1.90 ± 0.20	< 0.05
Disorders of carbohydrate metabolism	161 (56.9%)	192 (58.7%)	156 (56.5%)	117 (56.8%)	108 (67.1%)	> 0.05
History of previous smoking	132 (46.6%)	143 (43.7%)	11 (41.3%)	85 (41.3%)	57 (35.4%)	> 0.05
Chronic kidney disease	89 (31.5%)	91 (27.8%)	66 (23.9%)	58 (28.2%)	56 (34.8%)	> 0.05
Extracardiac arteriopathy	79 (27.9%)	68 (20.8%)	74 (26.8%)	66 (32.0%)	44 (27.3%)	> 0.05
Previous cardiac surgery	5 (1.8%)	3 (0.9%)	1 (0.4%)	3 (1.5%)	4 (2.5%)	> 0.05
Creatinine > 2.3 mg/dL	6 (2.1%)	18(5.5%)	9 (3.3%)	7 (3.4%)	7 (4.4%)	> 0.05
Preoperative PTCA	42 (14.8%)	47 (14.4%)	39 (14.1%)	32 (15.5%)	35 (21.7%)	> 0.05
Preoperative PTCA < 3 months	21 (7.4%)	18 (5.5%)	16 (5.8%)	8 (3.9%)	15 (9.3%)	> 0.05
Preoperative PTCA > 3 months	19 (6.7%)	28 (8.6%)	25 (9.1%)	24 (11.7%)	20 (12.4%)	> 0.05
Additive EuroScore	5.13 ± 3.47	4.75 ± 3.20	4.82 ± 3.37	5.21 ± 3.10	6.42 ± 4.03	< 0.001
Logistic EuroScore	7.36 ± 9.33	6.21 ± 8.59	6.40 ± 7.95	6.66 ± 7.99	10.97 ± 15.7	< 0.001
Hospitalisation [days]	20.6 ± 20.4	15.1 ± 10.1	14.0 ± 9.11	16.8 ± 21.3	17.2 ± 14.7	< 0.001
Postoperative intensive cardiac unit [days]	6.36 ± 4.40	6.24 ± 4.59	5.54 ± 4.45	7.05 ± 8.92	6.03 ± 10.5	< 0.001

PTCA — percutaneous transluminal coronary angioplasty

[p < 0.05], left radial artery [p < 0.001]). The number of anastomoses (p < 0.001) and duration of operations (p < 0.001) significantly increased (Table 2, Fig. 3B–D).

Postoperative complications

During the period of observation there was a statistically significant increase of the following parameters: chest tube drainage in the first 24 postoperative hours (p < 0.001), number of units of PRBC (p < 0.001), and the need for resternotomy (p < 0.01). However, the prevalence of the following parameters significantly decreased: in-hospital infections since 2006 (p < 0.01) and the need for IABP (p < 0.001). There was a tendency for a reduction of in-hospital mortality during the first four years of the analysed period, with an increase in the last year (p < 0.001) (Table 3).

DISCUSSION

This is the first systematic study in Europe on such a large population operated by one cardiac surgeon in one academic cardiac surgery centre, which has confirmed the trend of
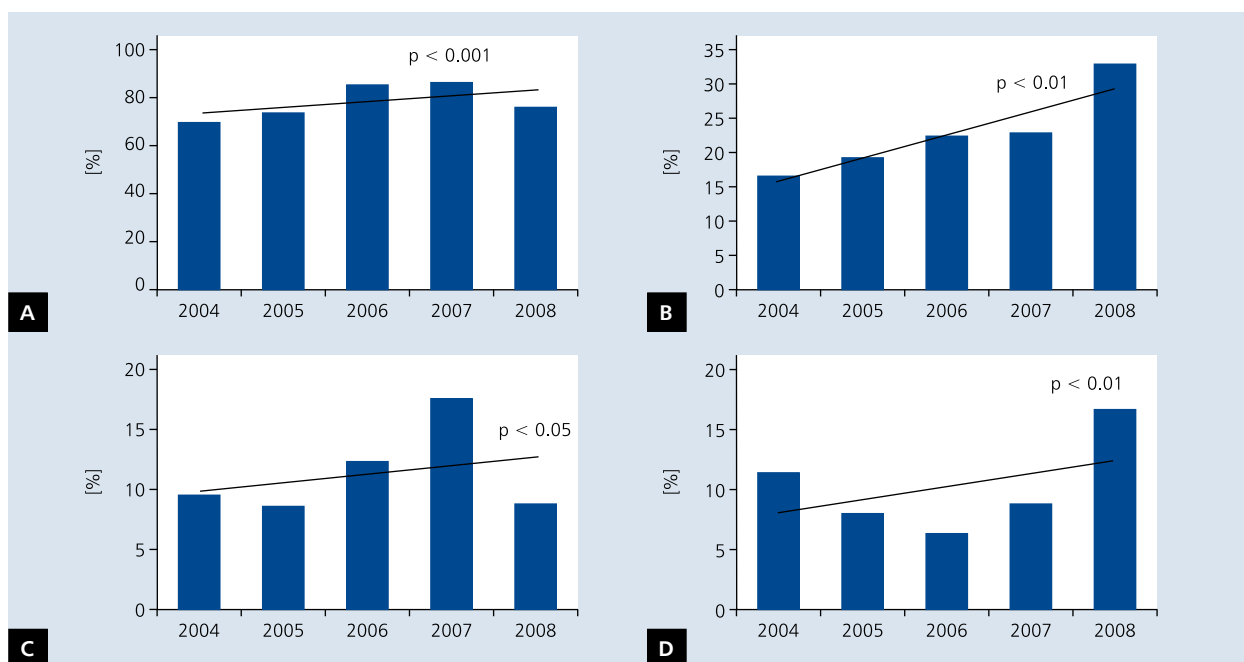
Figure 2. Changes in prevalence of selected risk factors for coronary artery disease; **A**. Hypertension **B**. Active smoking; **C**. Chronic pulmonary diseases; **D**. Neurological disorders (data expressed as a percentage of operated patients). Lines marked the five-year trend changes
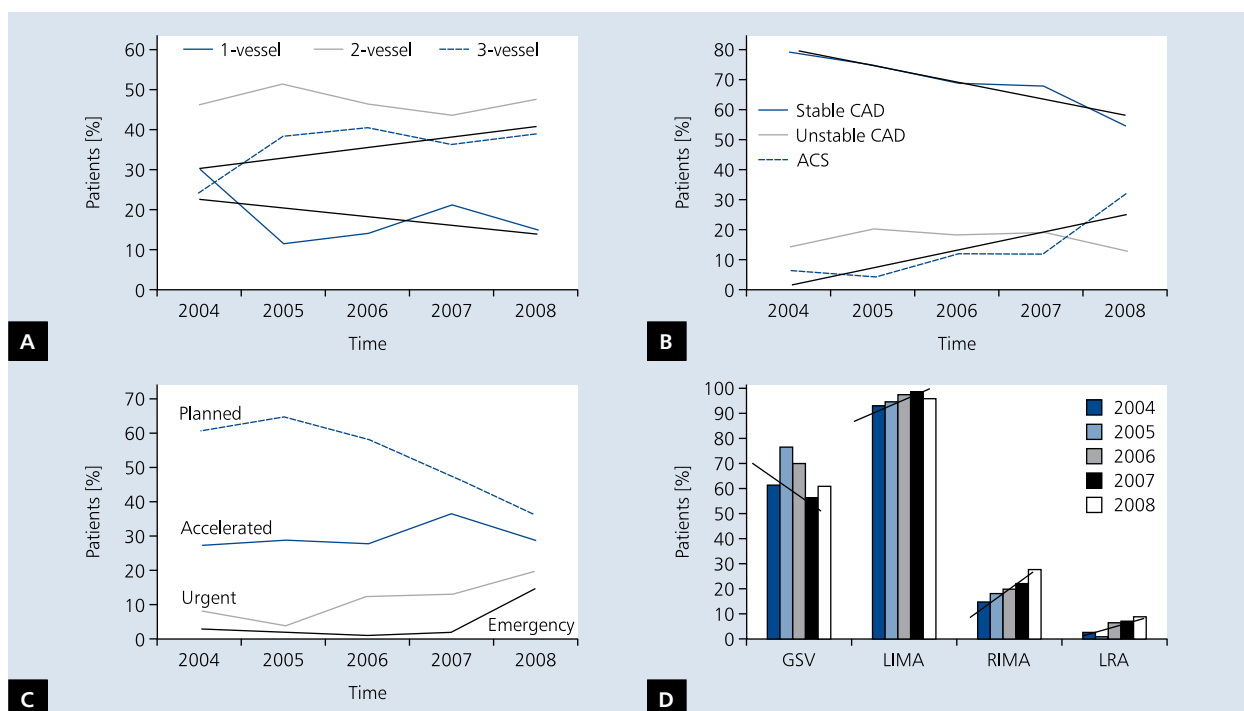
Figure 3. Changes in the number of diseased vessels (**A**), type of coronary artery disease (**B**), mode of surgery (**C**), and type of grafts (**D**). Lines marked the five-year trend changes; ACS — acute coronary syndrome; CAD — coronary artery disease; LIMA — left internal mammary artery; RIMA — right internal mammary artery; LRA — left radial artery; GSV — great saphenous vein

a deteriorating profile of patients with CAD referred for CABG. Including into the study only patients operated by a single, experienced cardiac surgeon eliminated the impact of the surgeon's experience on the results of treatment.
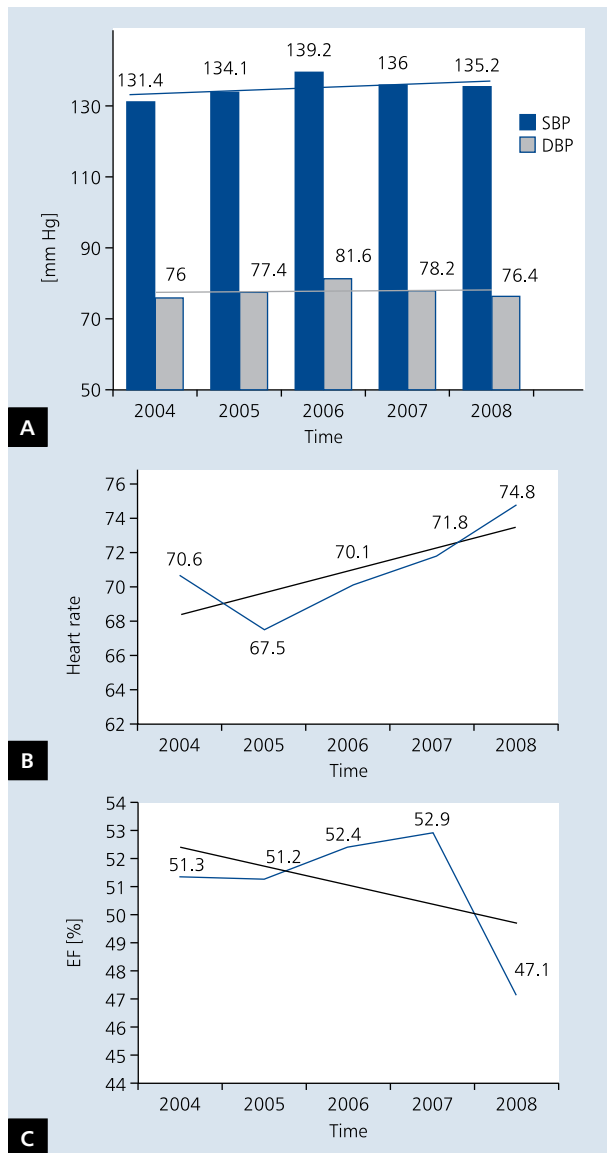
Figure 4. Changes in average systolic (SBP) and mean diastolic blood pressure (DBP) (**A**), mean heart rate (**B**), and ejection fraction (EF) of the left ventricle (**C**). Lines marked the five-year trend changes

Operated patients had more risk factors over time, which worsened the prognosis in the perioperative period. The same process can be observed in: the Mediterranean region from 1999 to 2007, England in the years 1997––2001 and 2001–2005, as well as in the United States from 1990 to 2009 [9–12]. However, we found unique data that enhance the differences between the general population and CAD surgical patients. In the general Polish population there was a declining tendency for occurrence of smoking from 2002 (34%) to 2011 (27%) [13]. Moreover, in the subgroup of patients with CAD, active smoking was found less frequently and more patients decided to quit smoking. It is interesting to notice the tendency towards an increase in the proportion of smoking women aged 55–70 years from 1997 to 2011. Additionally, in the subgroup of CAD patients with hypercholesterolaemia, active smoking was also found more often [13]. In our study an increased percentage of patients with active smoking was observed, and fewer of them decided to quit the habit; however, we did not analyse the impact of sex on the results. The disparity between our data and the NATPOL study might be a result of the clinical profile of the operated patients, who more often required urgent/emergency surgical treatment. The criteria set to find the possibility of smoking cessation — at least two weeks — were for some patients too restrictive, and they did not have time to modify their lifestyle.

We observed fluctuations in BMI and BSA that were small but significant. However, this is a growing problem in England (more patients operated with BMI > 35 kg/m^2) and the United States where patients have higher BSA, and there is a trend for this parameter to increase over time (mean value from 1.9 m^2 in 1990 to 2.0 m^2 in 2009) [9, 10, 12].

Among our patients, we recorded a constantly increasing mean heart rate on admission to the hospital, which is an indirect parameter of the increasing haemodynamic instability. Moreover, the patients in our group had an average lower EF than patients operated in other clinics. Our data have confirmation in an Italian study where operations were performed more often in patients with EF < 30% [11]. Among the patients who underwent CABG surgery in the United States an increasingly higher average EF was reported from 2000 to 2009 (50% to 55%, respectively) [10]. Additionally, the proportions of progression of CAD changed. In the last decade of the 20th century in the United States more patients were operated with three-vessel disease (58.1% to 70.8%, respec-

Table 2. Changes in chosen intraoperative parameters

Parameter	Year					P
	2004	2005	2006	2007	2008	
Anastomosis	2.02 ± 0.87	2.45 ± 0.91	2.42 ± 0.95	2.28 ± 0.98	2.38 ± 0.94	< 0.001
Operation [min]	171.1 ± 51.1	159.5 ± 46.1	169.3 ± 48.1	188.9 ± 57.4	218.3 ± 55.6	< 0.001

Table 3. Perioperative variables

Parameter	Year					P
	2004	2005	2006	2007	2008	
Chest tube drainage [mL]	641.7 ± 345.0	687.5 ± 468.3	745.6 ± 355.0	733.3 ± 489.2	841.0 ± 484.5	< 0.001
Packed red blood cells [U]	2.39 ± 2.92	1.90 ± 2.65	1.83 ± 2.33	2.62 ± 3.20	3.06 ± 5.75	< 0.001
Resternotomy	18 (6.4%)	12 (3.7%)	9 (3.3%)	20 (9.7%)	17 (10.6%)	< 0.01
In-hospital infections	30 (10.6%)	35 (10.7%)	56 (20.3%)	31 (15.1%)	17 (10.6%)	< 0.01
IABP	32 (11.3%)	15 (4.6%)	6 (2.2%)	11 (5.3%)	13 (8.1%)	< 0.001
IABP before CABG	8 (2.8%)	1 (0.3%)	3 (1.1%)	3 (1.5%)	5 (3.1%)	> 0.05
IABP during CABG	10 (3.5%)	5 (1.5%)	2 (0.7%)	3 (1.5%)	4 (2.5%)	> 0.05
IABP after CABG	14 (5.0%)	9 (2.8%)	1 (0.4%)	5 (2.4%)	4 (2.5%)	< 0.05
Stroke	2 (0.7%)	2 (0.6%)	2 (0.7%)	0	1 (0.6%)	> 0.05
Respiratory failure	7 (2.5%)	6 (1.8%)	6 (2.2%)	7 (3.4%)	5 (3.1%)	> 0.05
Dialysis	6 (2.1%)	6 (1.8%)	4 (1.5%)	2 (1.0%)	4 (2.5%)	> 0.05
AF in ICU	112 (39.6%)	132 (40.4%)	91 (33.0%)	79 (38.4%)	62 (38.5%)	> 0.05
Mortality	15 (5.3%)	7 (2.1%)	5 (1.8%)	3 (1.5%)	10 (6.2%)	< 0.01
Sudden cardiac arrest	12 (4.2%)	7 (2.1%)	3 (1.1%)	4 (1.9%)	6 (3.7%)	> 0.05
VF/VT	6 (2.1%)	7 (2.1%)	2 (0.7%)	3 (1.5%)	6 (3.7%)	> 0.05
Asystole/PEA	0	2 (0.6%)	0	1 (0.5%)	3 (1.9%)	> 0.05

IABP — intra-aortic balloon pump; CABG — coronary artery bypass graft; AF — atrial fibrillation; ICU — postoperative intensive cardiac unit; VF — ventricular fibrillation; VT — ventricular tachycardia; PEA — pulseless electrical activity

tively) [9] and the final ratio remained stable over time [10], which was confirmed by our results. However, data from an English study show no significant change in the proportion of patients operated with three-vessel disease [12]. A change can be seen in the proportion of patients with single-vessel disease operated in 2004 and 2005 (from 30% to 11%, respectively), which remained similar in subsequent years. Such a disparity may result from diffusion of PCI or from the introduction of drug eluting stents. It results in a reduction in the number of patients submitted to CABG [11].

Patients admitted to the hospital less often had diagnosis of stable CAD, whereas ACS was diagnosed more often. This is connected with the mode in which the operation was performed, which confirms the latest data from the United States [10]. In Italy increased frequency of operated cases with recent ACS and decreased frequency of operated patients with unstable angina was observed [11]. Additionally, for the needs of the study, we introduced the "accelerated" operation mode because it is known that among patients after ACS the mortality is lower if it is possible to postpone it. However, the number of patients operated in this mode remained stable over time [14–16]. One of the main results of this study is bringing to light the trend for more frequent revascularisation with arterial grafts, which is also a global trend [10].

OPCAB is a well-established method of treatment of CAD but is always burdened with a risk of complications. In the United States, in the first decade of the 21st century, a reduction in the number of major complications was observed:

stroke (from 1.6% in 2000 to 1.2% in 2009), reoperation due to excessive bleeding (from 2.5% in 2000 to 2.2% in 2009), and in-hospital infections (from 0.55% in 2000 to 0.37% in 2009). In contrast, more frequent acute renal failures (3.5% in 2000 to 3.6% in 2009) and AF episodes in the postoperative period (from 19.8% in 2000 to 21.1% in 2009) were reported [10]. Among the analysed patients a reduction in resternotomies from 2004 to 2006 was seen initially, but from 2007 more patients required reoperation. The main reason for performing these procedures was postoperative bleeding. Undoubtedly an important trend was the reduction of in-hospital infections, proof of good quality treatment.

An important worldwide trend is the reduction of in-hospital mortality after CABG. Mortality in the United States declined steadily from 3.9% in 1990 to 1.9% in 2009 [9, 10]. Another important trend is the consistently smaller than expected observed mortality when using logistic EuroScore [11]. Many factors contribute to the improvement of results of CABG. Additionally to the changes in surgical technique and post-operative treatment, patients are better qualified for operation with regard to their age and risk of complications [17–19]. In our study we observed also a declining tendency for mortality, except for in the final year, which strongly influenced the statistical results. Such an observation is probably influenced by the worst clinical profile of patients treated in the last year, who often had the following parameters: low EF, CKD, complex CAD, urgent/emergency surgeries, diagnosis of ACS/unstable angina, and high logistic EuroScore.

Limitations of the study

A limitation of the study is that it is a retrospective analysis of chosen parameters of patients' clinical profiles based on medical records. Such a study protocol limits indirect qualification of the patient's neurological status, which was possible only after verification of preoperative medical documentation or was described as ND when assessed EuroScore during hospitalisation. However, we disqualified from this group of patients who had no neurological symptoms and who were fully independent. On the other hand, such data reflects the everyday clinical management of patients. Selection of patients in randomised clinical trials, despite the reported statistical relationships, does not always reflect the patients seen by physicians in their everyday lives. The deteriorating profile of patients shown in the study is a global trend. In subsequent years (2010, 2012, 2013) an increasing number of operations performed due to CAD were seen in our Department of Cardiac Surgery. The surgeries were performed more often as elective and less often as OPCAB (from average 94.5% to 86.26%). Meanwhile, perioperative risk clearly decreased, although the indirect analysis is not possible because EuroScore II was introduced in 2012 (2010 EuroScore I — 9.07; 2012 EuroScore II — 2.09; 2013 EuroScore II — 1.76). Arterial conduits were employed at a similar level (92.89–95.92%), while the average number of grafts used increased (from 2.33 to 2.52). In-hospital mortality had a declining tendency after 2008 (2010 — 3.35%; 2012 — 1.43%; 2013 — 1.9%) [20]. Changes in the clinical profiles of patients result form natural fluctuations. However, the results prove the trend to operate patients with more complex CAD, achieving even better treatment results. Such a comparison has limitations because it is made on the basis of data from the National Register of Cardiac Surgery, where they are collected for the entire Clinic, not a single operator. Moreover, from 2008 a new surgeon with years of clinical experience, who performed an important number of operations, supported the Department. Finally, data from the Registry do not directly indicate the existence of co-morbidities.

The strength of this study is that it is impossible to compare clinical profiles of patients operated in different countries. There are big cultural, social, and economic differences among populations inside the European Union and in the United States. Significant differences were found in: Germany, the United Kingdom, Spain, Finland, France, and Italy, when comparing patients operated due to CAD in a period of one month. Nashef et al. [21] found discrepancies in age, BMI, diabetes mellitus, hypertension, CKD, CPD, and logistic EuroScore. Operated patients had significant variations of occurrence of the following cardiac risk factors: AF, heart failure, unstable angina, recent myocardial infarction, and low EF. Important differences were also found in the mode of surgery, the number of conduits and distal anastomoses, and mortality. However, in our study we had older patients, who had more comorbidities (higher BMI and more often: diabetes, hypertension, CKD, CPD). Surgery was performed more often in unstable angina and as an emergency operation, having patients with lower EF, who more often needed IABP, having similar mortality.

CONCLUSIONS

Over the five years analysed there was an increasing tendency to operate patients with hypertension, chronic lung diseases, active smokers, increasingly high risk of death calculated by additive/logistic EuroScore, a lower left ventricular EF, and higher heart rate at rest. Operated patients more frequently had three-vessel disease, were in unstable haemodynamic condition, the operation time and length of hospitalisation in the postoperative ward were systematically increasing, while the length of hospital stay was decreasing. More and more patients underwent urgent and emergency operations, and required resternotomies and larger amounts of red blood cell transfusions. On the other hand, they had more complete revascularisation (a higher percentage of arterial grafts and higher average number of grafts). These outcomes seem to reflect improvements in the surgical procedure.

Conflict of interest: *none declared*

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Zmiany charakterystyki pacjentów kierowanych na kardiochirurgiczną rewaskularyzację wieńcową w latach 2004–2008: doświadczenia jednoośrodkowe

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Streszczenie

Wstęp: W wyniku dynamicznego rozwoju kardiologii inwazyjnej i technik przezskórnej rewaskularyzacji na całym świecie obserwuje się pogorszenie profilu klinicznego pacjentów kwalifikowanych do pomostowania aortalno-wieńcowego (CABG), ponieważ coraz większa liczba chorych poddawana jest zabiegom z zakresu kardiologii inwazyjnej. Może to powodować pogorszenie się wyników odległych CABG, komplikować przebieg operacyjny i wpływać na gorsze postrzeganie samej kardiochirurgii. Brakuje systematycznej oceny tego zjawiska w populacji polskiej.

Cel: Celem pracy był opis profilu pacjentów z chorobą wieńcową (CAD) kierowanych na CABG w funkcji czasu poprzez wyznaczenie zmian ich: charakterystyki klinicznej, postępowania w leczeniu operacyjnym i wyników terapii, analizowanych podczas pobytu w szpitalu w kolejnych 5 latach hospitalizacji (2004–2008). Taki dobór lat pozwolił na retrospektywną ocenę ryzyka kardiochirurgicznego pacjentów w używanej w dokumentacji skali EuroScore, jak również uzupełnianej w części dokumentacji skali logistic EuroScore.

Metody: Badanie skonstruowano jako retrospektywne, przekrojowe, obejmujące wszystkich pacjentów leczonych w jednostkach I Katedry Kardiologii Warszawskiego Uniwersytetu Medycznego w Centralnym Szpitalu Klinicznym w Warszawie w latach 2004–2008. Analizę prowadzono na podstawie danych zebranych z historii chorób pacjentów. Do badania włączono wszystkich pacjentów przyjętych z powodu CAD spełniających dodatkowo następujące kryteria: CABG wykonane techniką bez krążenia pozaustrojowego, z dostępu przez sternotomię pośrodkową, operatorem był ten sam kardiochirurg. Kryteriami wykluczającymi z badania były: konieczność rozszerzenia zakresu operacji o dodatkowe procedury kardiochirurgiczne, konwersja z zabiegu bez zastosowania krążenia pozaustrojowego do zabiegu w krążeniu pozaustrojowym, zabieg wykonywany przez innego kardiochirurga. Analizę statystyczną przeprowadzono na podstawie danych mierzalnych i niemierzalnych w analizowanych podgrupach.

Wyniki: Do badania włączono 1253 chorych w wieku 65 ± 9,6 roku. W badanej populacji 26,3% stanowiły kobiety. U osób operowanych coraz częściej rozpoznawano nadciśnienie tętnicze (p < 0,001) i przewlekłą chorobę płuc (p < 0,05); chorzy coraz częściej palili tytoń (p < 0,01). Pacjenci operowani charakteryzowali się coraz niższą frakcją wyrzutową lewej komory (p < 0,001). W badanej grupie stwierdzono wzrost ryzyka zgonu ocenionego zarówno w punktowej skali EuroScore (p < 0,001), jak i logistic EuroScore (p < 0,001). Tętno pacjentów mierzone przy przyjęciu do szpitala było coraz wyższe (p < 0,001). Wzrastał odsetek osób z chorobą trójnaczyniową (p < 0,001). W ciągu analizowanych lat coraz rzadziej operowano chorych ze stabilną CAD, a coraz częściej pacjentów z ostrym zespołem wieńcowym lub niestabilnych wieńcowo. Coraz częściej operowano w trybie pilnym i w trybie nagłym. Średni czas trwania operacji ulegał wydłużeniu (p < 0,001), podobnie jak pobyt na oddziale pooperacyjnym (p < 0,001), podczas gdy czas pobytu w szpitalu skracał się (p < 0,001). W kolejnych latach przeszczepiano coraz większą liczbę pomostów (p < 0,001). Jednocześnie od 2005 r. przeszczepiano coraz mniej pomostów żylnych (p < 0,001), a coraz częściej lewą tętnicę piersiową wewnętrzną (p < 0,01), prawą tętnicę piersiową wewnętrzną (p < 0,05) i lewą tętnicę promieniową (p < 0,001). Coraz częściej zachodziła konieczność resternotomii (p < 0,01) i konieczność przetoczenia coraz większej ilości krwi (p < 0,001). Wśród chorych operowanych widoczne było zmniejszenie liczby zgonów wewnątrzszpitalnych z fluktuacją w czasie; w analizowanym okresie śmiertelność wynosiła średnio 3,2%.

Wnioski: Pacjenci poddawani chirurgicznej rewaskularyzacji wieńcowej stanowią grupę osób o podwyższonym ryzyku z większą liczbą chorób współistniejących. Jednocześnie techniki operacyjne stają się coraz bardziej wyrafinowane, dlatego oczekuje się dobrych rezultatów operacji.

Słowa kluczowe: pomostowanie aortalno-wieńcowe, choroba wieńcowa, choroby współistniejące, epidemiologia

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