Quality of life during 18 months after coronary artery bypass grafting

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Objective: The aim of the present study was to evaluate the change in health related quality of life (HRQoL) among elective coronary artery bypass grafting (CABG) patients. Methods: A total of 302 CABG patients were included in the study. Complete pre-, peri- and postoperative data were collected comprehensively in a database. HRQoL was measured by the 15D instrument. The 15D is a non-disease-specific, 15-dimensional, standardized and self-administered measure of HRQoL that can be used both as a profile and single index score measure. Baseline assessment was carried out before coronary angiography and assessment was repeated 6 and 18 months after surgery. Data were analysed by gender and in three age groups, i.e. patients <65 years, 65—74 years and ≥75 years. Results: Thirty day mortality was 1.0%, and the survival rate at 6 and 18 months was 99.0% and 96.7%, respectively. Preoperative HRQoL of CABG patients was lower in comparison to age- and gender-standardized Finnish population (P < 0.001). HRQoL of the patients improved significantly after CABG and the positive change lasted over the whole observation period, despite a slight decrease of 15D scores until 18 months. Although male patients had a higher preoperative HRQoL than women (P = 0.005), both genders benefited similarly from the operation. In the patients ≥75 years, the initial improvement of HRQoL returned to the preoperative level 18 months after the surgery. Conclusions: CABG patients experience a significant improvement in their HRQoL within 6 months after the operation and the effect remains through a mid-term observation time. However, expectations of improved HRQoL may have a limited value in decision making for surgery of coronary artery disease (CAD) for patients more than 75 years old.

Keywords: Coronary artery bypass; Quality of life; 15D; Elderly

1. Introduction

Improvement of health-related quality of life (HRQoL) and reductions of mortality and morbidity form the most important goals for coronary artery bypass surgery (CABG) [1—5]. Mortality and severe morbidity after CABG have decreased during past decades in spite of the fact that patients are now older and have a higher degree of co-morbidity than 10—20 years ago [6,7]. Particularly in older age, when the life expectancy is naturally limited, the HRQoL has emerged as an increasingly important indication for surgery.

In the present prospective study, we aimed at determining changes in HRQoL for CABG patients in a short (6 months) and in a mid-term (18 months) follow-up. Our objective was to compare postoperative HRQoL between the genders and in three age groups, <65 years, 65—74 years and ≥75 years.

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2. Material and methods

The data were collected between October 1, 2000 and January 31, 2003 at the Cardiological Department and at the Thoracic and Cardiovascular Department of Vaasa Central Hospital (VCH) in Finland. VCH provides adult open-heart surgery services for a population of 166 000 inhabitants and partly for a neighbour region with 195 000 inhabitants. The annual number of CABG procedures of the VCH unit is about 280—300. The majority of the operations, approximately 90% are conventional, augmented with cardiopulmonary bypass, whereas minimally invasive direct operations (MIDCAB) or off-pump operations (OPCAB) constitute not more than 10% of procedures.

Patients having coronary angiography were asked to participate in the study and their agreement was confirmed by a written consent. The research nurse carried out the primary interview according to structured research scheme, and the patients filled in the preoperative questionnaire for assessing HRQoL at the same time. Patients who underwent...
coronary evaluation followed by an urgent operation were interviewed in the ward after angiography. For re-evaluation, questionnaires were mailed to the patients 6 and 18 months after surgery. Thus, the each patient self-administered three HRQoL questionnaires. Emergency cases were excluded.

The HRQoL was measured by the 15D instrument. The 15D is a non-disease-specific, comprehensive, multidimensional, standardized and self-administered measure of HRQoL, which can be used both as a profile and single index score measure [8]. It describes the health status along 15 dimensions: mobility, vision, hearing, breathing, sleeping, eating, speech, elimination, usual activities, mental function, discomfort and symptoms, depression, distress, vitality and sexual activity. Each dimension comprises five answer options. The single index score, 15D score on a 0–1 scale, represents the overall HRQoL, and is calculated from the health state descriptive system by using a set of population-based preference or utility weights. The maximum score is 1 (no problems on any dimensions) and the minimum score 0 (being dead). The 15D scores have proved highly reliable, sensitive and responsive to treatment related change. The instrument has been tested in various states of illness [9—12], also concerning invasive treatment of coronary artery disease (CAD) [5]. If a patient left a question or two out of 15 unanswered, the missing data were derived and replaced according to 15D instructions1 [13]. The baseline status of HRQoL of the present study cohort was compared with a sample of 4,111 age- and sex-standardized people from the Health 2000 project of the Finnish National Public Health Institute. Health 2000 was a health interview/examination survey carried out in Finland from fall 2000 to spring 2001, in which the 15D instrument was used for assessing HRQoL.2 Other comparisons were made within the material under discussion. The follow-up analysis was performed between surviving patients: thus the 15D scores of deceased patients (index score = 0) were counted out from statistical calculations.

Our hospital carried out 553 CABG operations during the study period. A total of 302 patients (239 male and 63 female) filled in the baseline questionnaire and underwent CABG. In the age group <65 years there were 117 patients, in the age group 65–74 years 129 patients and in the oldest group (>75 years) 56 patients. The excluded patients (n = 251) were more often female (31.5% vs 20.9%, P = 0.004), older (mean age 68.9 vs 66.3 years, P = 0.002), were operated more often urgently (12.4% vs 1.3%, P < 0.001) and had a higher additive Euro Score (mean 5.3 vs 3.4, P < 0.001). After 6 months 97.7% of surviving patients returned the questionnaire, and after 18 months the participation rate was 96.3%.

Data concerning clinical risk factors, findings of coronary catheterisation, details of surgery, extra-corporeal circulation (ECC) and details related to the postoperative outcome, including morbidity and mortality, were collected in a computerized database (Summit Vista®, Summit Medical Systems Inc., Minnetonka, USA) according to the Society of Thoracic Surgeons (STS) definitions [14,15]. Operative risk was estimated according to Euro Score, and both additive and logistic mortality risk [16] was calculated for every patient.

Postoperative outcome events and complications included 30-day mortality, time of postoperative ventilation support, stroke, deep sternum wound infection or mediastinitis, sepsis, low output syndrome (LOS), renal failure (serum creatinine >200 μmol/l at any time postoperatively with or without the need for dialysis) and perioperative myocardial infarction (MI) (creatine kinase myocardial band, CK-MB, >50 U/l at any time postoperatively and/or a new Q-wave in the electrocardiogram). Atrial fibrillation (AF) was recorded as an adverse event and registered if medication was necessary to achieve normal sinus rhythm.

Patient-related and postoperative outcome variables are presented as a percentage, or as a number and a percentage. Summary scores and level values for the dimensions were calculated according to the scoring algorithm of the 15D. Baseline and follow-up variables were compared using paired samples t-test or analysis of variance (ANOVA) for repeated measurements. Continuous variables with non-normal distributions were compared by Kruskal–Wallis test. A P-value <0.05 was considered statistically significant. Statistical analyses were performed using SPSS 14.0 for Windows.

3. Results

The mean age of the study population was 66.3 (SD 9.0) years. 79.1% of patients were male (Table 1). Female patients were older (mean age 69.2 vs 65.3 years, P = 0.004), had more often diabetes (P = 0.024), obesity (P = 0.031) and unstable angina (P = 0.014) than male patients. Three patients died within 30 days after surgery giving an operative mortality rate of 1.0%. During the first 6 months period, there were no more deaths giving a survival rate of 99.0%. At 18 months, seven more patients had died, the survival rate at 18 months being 96.7%. All deaths within 30 days occurred for cardiac reasons. There was one death on the table due to unresponsive LOS in redo-CABG, one perioperative MI and death on the first postoperative day, and one unresponsive arrhythmia and death on the second postoperative day. The later mortality was due to malignancies, except one myocardial infarction and one septicaemia. Details of operations are presented in Table 2 and major operative complications or adverse events in Table 3.

The mean 15D score of the CABG patients at baseline and that of the age- and gender-standardized reference sample was 0.8293 and 0.8709, respectively, (P < 0.001) (Fig. 1). The patients were significantly worse off on 8 dimensions out of 15, e.g. mobility, vision, breathing, sleeping, usual activities, distress, vitality and sexual activity. On the contrary, the score of mental function was higher in the study population as compared to the reference material. During the first 6 months after the operation, there was a statistically significant improvement in 15D score of the CABG patients. It was followed by a decrease from 6 months onwards until 18 months after the operation, but the mean 15D score of the surviving patients still remained at a significantly higher level than before the surgery (P < 0.001) (Fig. 2). Male patients had a higher 15D score at baseline in comparison with females (P = 0.006). In both genders, the index score improved in the beginning of recovery in the same manner, whereas from 6 months onwards the index score declined again for both male

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1 http://www.15d-instrument.net/rmd.
and female patients. However, it still remained at a significantly higher level for both genders as compared to the baseline. Male patients retained a higher score than female patients at 6 months and after 18 months, but the difference was no more statistically significant (P = 0.185 and 0.165, respectively).

In each of the three age groups, i.e. patients <65 years, 65–74 years and >75 years, the 15D score improved considerably during the first 6 months followed by a decrease from 6 months onwards to 18 months (Fig. 3). A significant difference in the 15D score at each measurement point was evident in favour for the youngest age group: before operation P < 0.001, at 6 months P = 0.003 and at 18 months P < 0.001. However, in surviving patients older than 75 years the subsequent decline was steeper than in the younger ages, and the 15D score returned to the preoperative level and even to a slightly lower level than before surgery.

During the first 6 months postoperatively, there were seven dimensions on which the patient sample experienced a significant improvement: mobility, breathing, usual activities, discomforts and symptoms, distress, vitality and sexual activity. Only on one dimension, mental function, there was a deteriorating trend (P = 0.057). Between 6 and 18 months in

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the follow-up, a significant decline was seen on seven dimensions, i.e. mobility, vision, hearing, elimination, usual activities, mental function and sexual activity and on three dimensions (hearing, elimination, mental function) the mean score value was even lower at 18 months than before the operation (Fig. 4). In male patients, a significant improvement was seen on the dimensions of mobility, breathing, usual activities, distress and vitality, whereas female patients experienced a positive change in mobility, breathing, sleeping, discomforts and symptoms, distress and vitality (Fig. 2). Changes in the dimension level values became fewer and smaller with increasing age, and in the age group >75 years only hearing and breathing improved significantly during the first 6 months postoperatively (Fig. 3).

4. Discussion

HRQoL is defined as an individual’s perception of his/her symptoms, wellbeing and physical and mental functional capacity [17]. Concept of HRQoL is wide-ranging with different fields of human life influencing it, and its complexity and multidimensional nature are a challenge for researchers. Assessment of outcome after CABG is usually based on objective evaluation of cardiovascular status and physical performance. However, outcome cannot be assessed solely in objective terms, as such indicators do not explain how persons perceive and experience their lives. Previous reports have shown improvement in HRQoL short-term after CABG, followed by small but significant decline in some
scores of physical health and health perception later in the follow-up [2,6,18].

Various instruments have been used in earlier studies to measure HRQoL in CABG patients, most commonly the Nottingham Health Profile (NPH) [19], the Medical Outcomes Study Short Form (SF-36) [20], RAND 36-Item Health Survey (RAND-36) [21] or EuroQol (EQ-5D) [22]. In the present study, we used the 15D, which has been shown to be a valid, feasible and sensitive tool to assess HRQoL in various fields of human life. Being a general health-related and not a disease-specific instrument, it allows comparison with other patient groups and with the general population. The repeatability of the instrument used provides additional information, which may be relevant to the treatment under scrutiny. The 15D has also been shown to be reliable and useful among surveys for CAD patients [5].

CAD compromises the HRQoL quite widely. This is reflected in a poorer 15D score in the CABG patients compared with the general population before operation (Fig. 1). However, the present study demonstrated a significant improvement in the HRQoL of CABG patients during the first 6 months after surgery. This finding may reflect successful course of the operation and fulfilment of expectations for each individual patient recovering mostly without any major complications or adverse events. A considerable improvement in the beginning of the recovery was, however, followed by stabilization and some improvement in the HRQoL, a finding that has been reported also previously [6,19]. An important finding in the present study was that the initial improvement in the HRQoL, despite of later stabilization, persisted up to 18 months postoperatively. This improvement was significant in both genders and in the age groups <75 years. To that extent, the results of the present study support previous reports.

Of single dimensions, in breathing there was seen a fast and continuous improvement in both men and women and in all age groups. This may mostly reflect disappearance of chest discomfort after revascularization of the myocardium with repair of ischaemia and possible diastolic dysfunction, allowing a sense of lighter breathing. It may also indirectly indicate absence of recurrent angina during the observation time regardless of gender or age. On the other side, improvement in mobility, usual activities and also in sexual activity may be based on relief of angina and on improvement in physical capacity, which before treatment restricted an individual’s life. In addition to that, a change to better, which took place in dimensions ‘discomfort and symptoms’ and ‘vitality’, may be a sign of a better zest for life, when the individual experiences that the earlier threatening illness has been cured and its symptoms have disappeared.

Reduced 15D scores between 6 and 18 months, which were seen in the present study, may actually mean some deterioration in HRQoL in the later phase of the recovery. The phenomenon was seen in both genders and in all age groups corresponding to earlier findings in development of HRQoL after bypass surgery [6,18]. The change was associated not merely with physical functions, i.e. mobility, but also with functions of sense (hearing, vision), daily activities and mental function. The change in hearing or vision may be explained by the time and increasing age of the patients, and the same may be related also to daily activities. Reduced score in mental function after surgery was not unexpected, as postoperative cognitive decline is often seen in elderly patients after both general and cardiac surgery [23,24]. This may be attributed to alterations in the physiology of the circulation during the extra-corporeal perfusion, microembolism, etc. The finding cannot be settled only by questioning instruments but more specific neurological and psychological methods, longer observation time and larger patient groups are needed. However, despite the later reduction, the HRQoL still remained at a significantly higher level 18 months after surgery in comparison with the time before operation. This reinforces the earlier opinion of improved HRQoL after bypass surgery for CAD.

Corresponding to previous studies [6], the preoperative HRQoL was significantly lower in females than in males. The finding may mainly reflect the higher age and more morbidity of female patients at the time of the operation. However, women demonstrated significant and even a more considerable improvement in their HRQoL during the first 6 months followed by a similar decrease of HRQoL in comparison with men further onwards. Dimensions, in which the change occurred, were generally the same in both genders. The trend was, nevertheless, in accordance with that reported in previous papers.

The present study has some limitations which restrict the interpretation of the results. First, despite of its prospective nature, the patients in the sample were not completely consecutive. The sample consisted of patients who were submitted to elective coronary angiography based on angina pectoris and ischaemic findings in the stress test and who gave their consent to be included in the study. Thus, the sample reflects mainly an elective patient material. There were times during which the collection of data for the study was suspended due to short breaks in operative activity at our unit because of holidays or leaves of absence of the research nurse. This reduced the number of patients included, from 553 potential candidates to 302 individuals. On the other hand, during the follow-up the participation of the patients in the study remained at a high level and drop-outs were few. This gives strength to the study and its conclusions. The material consisted generally of older patients than reported by previous authors. Due to a relatively low total number of patients, the number of elderly patients (>75 years) also remained quite low which may restrict the evaluation of
results in that age group. The present study focused on evaluating only the changes in HRQoL—there were no assessments of other parameters of health, i.e. capacity for physical stress or mental health.

On the basis of the present study, it is concluded that CABG patients experience a significant improvement in their HRQoL quite soon after surgery and the effect remains at least through 18 months onwards. Both male and female patients under the age of 75 years seem to share a similar experience. The most important changes are seen in physical dimensions, i.e. mobility, breathing, usual activities and vitality. The patient group >75 years forms an exception. Elderly people, in fact, do benefit from CABG as improved HRQoL at the beginning of their recovery but they may lose a lot of the benefit in a relatively short time period later on. Thus, expectations of improved HRQoL may have a limited value in decision making for surgery of CAD for elderly people.

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References


