Quality of Life after Mitral Valve Repair

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Background and aim of the study: **Mitral valve repair for degenerative and ischemic mitral valve regurgitation has been shown to be a durable procedure. The study aim was to evaluate the quality of life of patients who had undergone mitral valve repair, and to compare it to that of an age- and gender-adjusted Finnish general population.**

Methods: **Among 130 late survivors after mitral valve repair, 109 (83.8%) answered the RAND-36 Health Survey questionnaire; these patients form the basis of the present study.**

Results: **The Wilcoxon test showed significantly higher mental health (p = 0.04) and pain scores (p = 0.015) and a lower role functioning/physical score (p = 0.008) in the study group. The scores of the other RAND-36 Health Survey variables of the study group were similar to those of the age- and gender-adjusted general population. The mean total score for the study group was 512 (median 532, IQR 360-678), compared to 522 (median 538, IQR 468-549) in the general population (p = 0.72) (only 95 patients were included in the analysis due to isolated missing scores).**

Conclusion: **The quality of life of long-term survivors after mitral valve repair, as assessed by the RAND-36 Health Survey, is similar to that of an age- and gender-adjusted general Finnish population.**

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Mitral valve repair for degenerative and ischemic mitral valve regurgitation is a durable procedure (1-11). At 10-year follow up, freedom from fatal cardiac events after mitral valve repair ranged from 92% (1) to 94% (10), whilst freedom from redo mitral valve surgery ranged from 72% (10) to 94% (11). Mitral valve repair has also been shown to be associated with significant improvement in terms of functional capacity (11-13), though the late quality of life of these patients has not been adequately assessed.

Goldsmith et al. (12) reported on improvements in the quality of life, as assessed by the short-form 36 questionnaire, three months after mitral valve repair and replacement. Mitral valve repair was associated with a significant increase in seven out of eight parameters, whereas after mitral valve replacement the improvement was only modest (12). Mitral valve repair was found to be an independent predictor of an early better quality of life (12). The same authors also observed an improvement in the quality of life of patients who underwent mitral valve surgery and were aged 75 years or older (13). However, to the present authors' knowledge, there are no reported data on any possible difference between quality of life late after mitral valve repair and the normal population. Herein are presented the results of a study comparing the quality of life, as assessed by the RAND-36 Health Survey (14,15), of patients who had undergone mitral valve repair, with that of an age- and gender-adjusted Finnish general population.

Clinical material and methods

Patients

Between 1993 and 2000, a total of 164 consecutive patients (mean age 60.7 years; median age 63.0 years; interquartile range (IQR): 53.1 to 68.6 years) underwent mitral valve repair either isolated or in combination with other procedures at the authors' institution. Data related to preoperative, intraoperative and postoperative variables were collected retrospectively from patients' records by a single surgeon (J.H.). Data on postoperative outcome after discharge from the cardiac surgery ward were obtained by reviewing the

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hospital records inclusive of data from all wards of the hospital. If the patient was discharged to another hospital for medical treatment or rehabilitation, the outcome data were retrieved from the discharge records of the latter institutions. In addition, patients were contacted by mail, whilst causes of late death were obtained from a national registry.

Clinical data and surgical technique

The clinical and operative data are summarized in Tables I and II. Coronary angiography was performed routinely to assess the status of the coronary arteries and, in those patients who had previously undergone coronary artery bypass surgery, of the bypass grafts. Surgery was performed via a median sternotomy, utilizing moderate systemic hypothermia and antegrade/retrograde cold blood cardioplegia. Transesophageal echocardiography was carried out intraoperatively immediately before and after repair in all patients. Transthoracic echocardiography was performed before discharge in 152 patients. Low molecular-weight heparin was administered postoperatively, and this was followed by warfarin for about three months, unless patients had a prosthetic valve or chronic atrial fibrillation which indicated a need for indefinite anticoagulation treatment.

Table I. Preoperative risk factors.

Parameter	No. of patients
Age (years)*	60.4 (median 63.0, IQR: 52.9-68.1)
Gender ratio (F:M)	81:28
BSA (m^2)*	1.9 (median 1.9, IQR: 1.8-2.0)
BMI (kg/m^2)*	25.8 (median 25.4, IQR: 22.8-27.7)
Asthma/COPD	7 (6.4)
Lower-limb ischemia	6 (5.5)
Hypertension	13 (11.9)
Hyperlipidemia	11 (10.1)
Diabetes	7 (6.4)
TIA/stroke	6 (5.5)
Active endocarditis	0 (0)
Coronary artery disease	
Previous MI	7 (6.4)
Recent MI	3 (2.8)
Unstable angina pectoris	2 (1.8)
Left main disease	9 (8.3)
NYHA functional class	
I	4 (3.7)
II	58 (53.2)
III	33 (30.3)
IV	14 (12.8)
Atrial fibrillation	21 (19.3)
Etiology	
Myxomatous degeneration	94 (86.2)
Rheumatic	3 (2.8)
Ischemic	5 (4.6)
Endocarditis	3 (2.8)
Penetrating trauma	2 (1.8)
No evident cause	2 (1.8)
Prior cardiac operation	
ASD repair	2 (1.8)
LVEF (%)*	63 (median 65, IQR: 57-70)

*Values are mean.
Values in parentheses are percentages.
ASD: Atrial septal defect; BMI: Body mass index; BSA: Body surface area; COPD: Chronic obstructive pulmonary disease; LVEF: Left ventricular ejection fraction; MI: Myocardial infarction; TIA: Transient ischemic attack.
IQR: 25th and 75th interquartile range.

Quality of life assessment

The validated Finnish version of the RAND-36 Health Survey questionnaire (15) was sent to all long-term survivors, and re-mailed to non-responders. In

Table II. Operative details.

Parameter	No. of patients
Type of operation	
Elective	93 (85.3)
Urgent	12 (11.0)
Emergent	4 (3.7)
Findings at operation	
Annulus dilatation	12 (11.0)
Anterior leaflet disease	15 (13.8)
Posterior leaflet disease	55 (50.5)
Both anterior and posterior leaflet involved	25 (22.9)
Ruptured chordae	61 (56.0)
Ruptured papillary muscle	2 (1.8)
Calcified valve	0 (0)
Ring annuloplasty	62 (56.9)
Other annuloplasties	42 (38.5)
Leaflet resection and reconstruction	86 (78.9)
Shortening of the chordae	8 (7.3)
Chordae reconstruction with PTFE thread	25 (22.9)
Associated procedures	
CABG	32 (29.4)
Tricuspid valve repair	6 (5.5)
ASD closure	4 (3.7)
Maze	5 (4.6)
Aortic valve replacement	1 (0.9)
Aortic cross-clamp time (min)*	142 (median 134, IQR: 112-177)
CPB duration (min)*	189 (median 179, IQR: 153-216)
Surgery duration (min)*	285 (median 270, IQR: 240-310)
Intraoperative bleeding (ml)*	957 (median 700, IQR: 500-1025)

*Values are mean.
Values in parentheses are percentages.
ASD: Atrial septal defect; CABG: Coronary artery bypass grafting; CPB: Cardiopulmonary bypass; PTFE: Polytetrafluoroethylene.
IQR: same as Table I.

the case of no response, patients were contacted by telephone. The quality of life as assessed by the RAND-36 Health Survey in these patients was compared to that of an age- and gender-adjusted Finnish general population, as assessed previously by Aalto et al. (15).

Statistical analysis

Statistical analyses were carried out using SPSS statistical software (SPSS v. 10.0.5, SPSS Inc., Chicago, IL, USA). Continuous variables were reported as the mean and median with 25th and 75th interquartile range (IQR). The Wilcoxon test was used to assess any difference in terms of quality of life-related variables between the present patients and an age- and gender-adjusted general Finnish population. The Kaplan-Meier method was used to estimate survival. A p-value <0.05 was considered to be statistically significant.

Results

The mean follow up period was 5.1 years (median 4.9 years; IQR: 3.2 to 7.2 years). Eleven patients (6.7%) died during the immediate postoperative period. Amongst operative survivors, 12 patients (7.9%) died

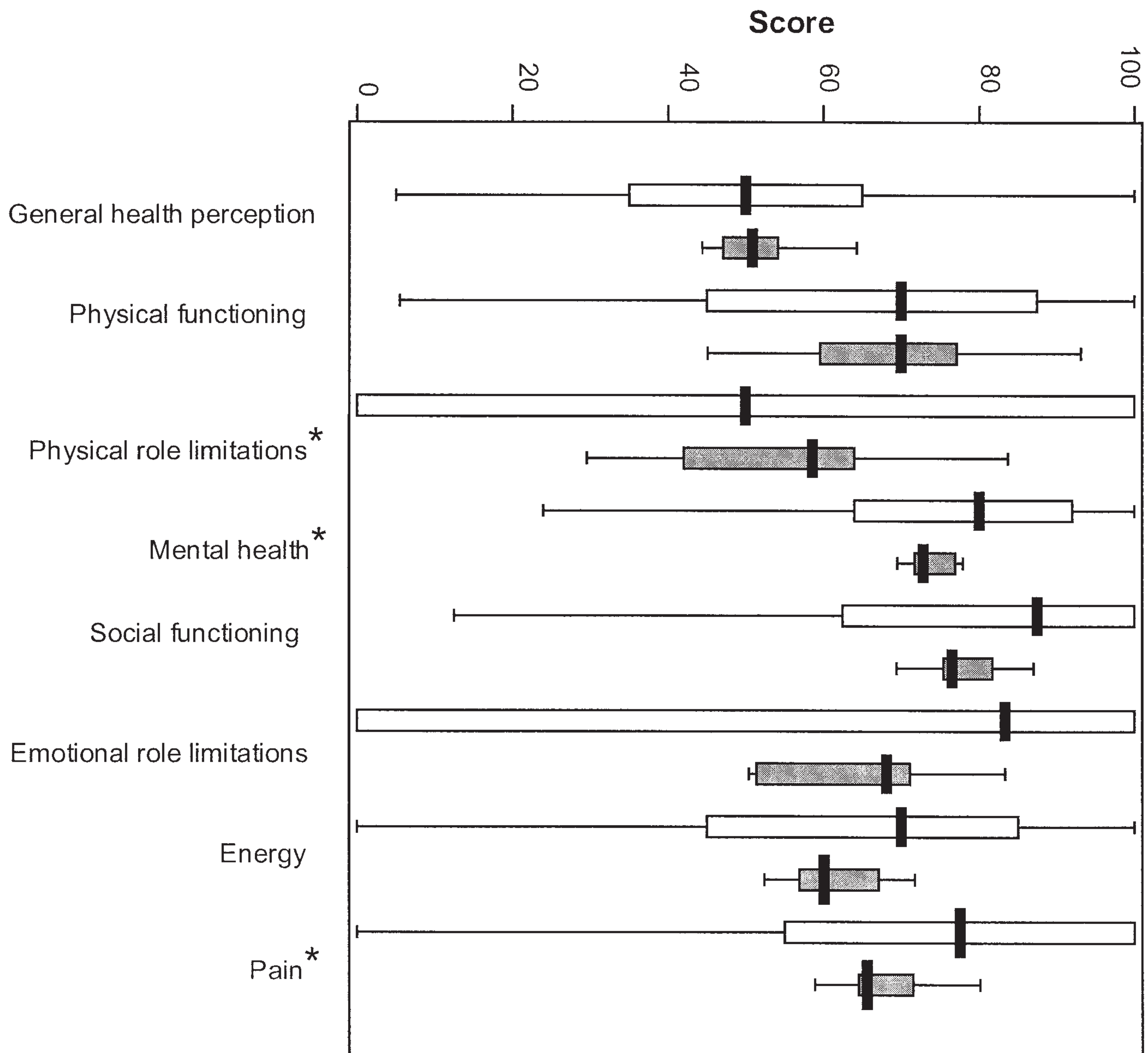

*Figure 1: RAND-36 Health Survey variable scores of long-term survivors after mitral valve repair (open bars) and of an age- and gender-adjusted general Finnish population (filled bars). *, p <0.05.*

later from cardiac causes. Of these patients, two died from stroke, three from cancer, two from trauma, and one each from pneumonia, postoperative multiorgan failure, gastrointestinal bleeding and subdural hematoma.

Nine patients (5.5%) underwent repeat cardiac surgery after mitral valve repair, eight patients (4.9%) having undergone redo mitral valve surgery (six had valve replacement, two had repeat valve repair). Four patients underwent redo mitral valve surgery within one year after the initial surgery.

At the 10-year follow up, the overall survival rate was 70.2% in the study group, and 74.8% among the operative survivors. In the general population, the expected 10-year survival is 93.9%.

Among 130 late survivors, 109 (83.8%) responded to the questionnaire, and these formed the basis of the present study. The 21 non-responders were rather young at the time of mitral valve repair (mean 53.4 years; median 55.8 years; IQR: 44.5 to 64.2 years) and had also a rather long survival after surgery (mean 7.5 years; median 7.8 years; IQR: 5.8 to 9.7 years). Two of these patients had previously undergone surgery for atrial septal defect and for aortic coarctation, respectively. Six patients underwent concomitant coronary artery bypass surgery. Immediately after mitral valve repair, echocardiographic examination was performed in all but three of the patients. One patient had grade 2 residual mitral valve regurgitation, whilst the others had from grade 0 to 1 residual regurgitation.

The clinical and operative data of long-term survivors who responded to the questionnaire are summarized in Tables I and II. Immediately after surgery, 56 patients (51.4%) had no signs of mitral valve regurgitation at echocardiography, while 42 (38.5%) had grade 1 regurgitation and six (5.5%) had grade 2. Echocardiographic examination was not performed in five patients during the in-hospital stay.

The median quality of life scores in the study group compared with those of an age- and gender-adjusted general population, as depicted in Figure 1. A Wilcoxon test indicated significantly higher mental health ($p = 0.04$) and pain scores ($p = 0.015$) and lower role functioning/physical score ($p = 0.008$) in the study group. The mean total score for the study group was 512 (median 532; IQR: 360 to 678), but was 522 (median 538; IQR: 468 to 549) in the age- and gender-adjusted general population ($p = 0.72$) (only 95 patients were included in the analysis due to isolated missing scores).

Coronary artery disease, concomitant coronary artery bypass surgery and immediate postoperative residual mitral valve regurgitation of grade >1 were not associated with a significantly poorer quality of life.

Discussion

Mortality and morbidity do not adequately depict the outcome of patients undergoing cardiac surgery as the latter is intended particularly to bring an improvement in physical and psychological conditions. Thus, measures of quality of life are of major importance in evaluating the overall success of any cardiac procedure. The RAND-36-Item Health Survey is recognized as a valuable method for evaluating the quality of life after cardiac surgery (16), and it has also been proven effective in evaluating outcome after coronary artery bypass surgery (17). In the present study, the survey showed that long-term survivors of a major surgical procedure such as mitral valve repair can experience a good quality of life which, in overall terms, is similar to that of the general population. Thus, the well-demonstrated durability of mitral valve repair is associated with an improvement/preservation of the patient's physical and psychological conditions. This finding is of particular relevance as this patient population is likely to be in rather poor general condition and to have a variety of comorbidities. In fact, the long-term survival of these patients is much lower than would be expected in an age- and gender-adjusted general population. Nonetheless, it is possible that any small improvement in terms of physical and psychological conditions following mitral valve repair is perceived by the patient as a major, positive change in their quality of life. This is suggested by the significantly higher mental health and pain scores, despite a significantly lower physical role limitation score among these patients. Indeed, there is evidence that such a good quality of life is experienced by only some of the patients undergoing mitral valve repair because of relevant immediate and late cardiac-related mortality. Furthermore, the wide range of scores in the RAND-36 Health Survey variables (see Fig. 1) suggests that any beneficial effect of mitral valve repair on the patient's physical and psychological conditions is not shared equally by the patients.

Study limitations

The present results might have been biased by the retrospective nature of this study, and by the relevant number of non-responders. It is not easy to carry out a prospective study on this topic because of the rather low incidence of mitral valve regurgitation requiring surgical repair and the need for a long follow up. Although the proportion of non-responders was relatively high (16.1%), this group of patients was rather young at the time of operation and survived long after surgery. Nonetheless, these observations suggest that they are likely in good condition.

In conclusion, the quality of life of long-term survivors after mitral valve repair, as assessed by the RAND-36 Health Survey, is similar to that of an age- and gender-adjusted general Finnish population.

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