

Quality of Life in Octogenarians Undergoing Surgical Aortic Valve Replacement

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Abstract

Objective: The assessment of quality of life in the elderly should be considered when analysing the benefits of any therapeutic intervention. The aim was to analyse the quality of life in octogenarians undergoing surgical aortic valve replacement.

Methods: We conducted an observational and descriptive study from January 2006 to July 2008. One-hundred-three Caucasians patients over 80 years of age undergoing aortic-valve replacement were followed-up. Three successive telephone interviews were conducted using the EuroQoL-5D questionnaire. The first was made in August 2009, the second in February 2011 and the third in February 2013. An age and gender matched group of 166 people served as controls. Categorical variables were compared using McNemar's test. Continuous variables were analysed using Student's test. Comparisons with the control group were performed using Student's t-test. A Chi-squared test was used to identify the profile of patients who benefitted most from surgery.

Results: Significant differences were observed in the areas of mobility, usual activities and pain. A significant improvement was also observed in the VAS and the EQ-5D index. Compared with controls, significant improvement in VAS score was observed in females, and this difference was maintained at the final survey. Patients had significantly lower EQ-5 D indices than controls.

Conclusion: We conclude that aortic valve replacement leads to a significant improvement in subjective quality of life. However, this improvement was not evident for objective health items. Thus, patients remain different from controls in terms of VAS and the EQ-5D index scores.

Keywords: Aortic valve stenosis; Aortic valve replacement; Elderly; Quality of life

Introduction

Western societies are aging and a social policy of Western countries will be to promote quality of life (QOL) for the elderly. Consequently, quality of life assessment in the elderly should be considered when analysing the risks and benefits of any therapeutic intervention.

The European registry found that aortic valve stenosis (AS) is more frequent in subjects over 75 years [1], affecting up to 4% of the individuals over 85 years of age [2]. Considering that 6.9% of individuals in Asturias, Spain, are older than eighty [3], the health economic impact may be considerable.

Cardinal symptoms such as angina, dyspnoea and syncope, are associated with poor prognosis and once these symptoms appear, the definitive treatment is aortic valve replacement [4,5]. Although some studies have demonstrated that surgical procedures in octogenarians can improve functional status, morbidity and mortality, thus far, few ones have investigated quality of life after aortic valve replacement [6,7].

In the 1960's, the Movement of Social Indicators of the Chicago School developed the theoretical concept of QOL. Since then, the

concept has been understood in two ways: as welfare and as a vital objective associated with psychological well-being [8].

In 1993, the World Health Organization Quality of Life (WHOQOL) group defined the term as an individual perception of life within their cultural context as well as its objectives, expectations, concerns and interests [9].

Because QOL is conceptually broad and its analysis is complex, the term has gradually developed to cover quality of life related to health (HRQOL) which enables quantification and comparisons between health issues and QOL [10]. Subsequently, HRQOL has evolved into a multidimensional concept that encompasses both subjective effects of disease and treatment as well as the effects of treatment, enabling comparisons between treatments [11].

The EQ-5D instrument is a generic questionnaire that is quick and easy to use and provides reliable and valid results. The current version was developed in 1991 and was validated in Spain by the Catalan Institute of Public Health [12].

We hypothesized that aortic valve replacement (AVR) in octogenarians ensures a QOL identical to an age matched population. We assessed the impact of AVR on QOL in these patients and identified the patients who benefit the most.

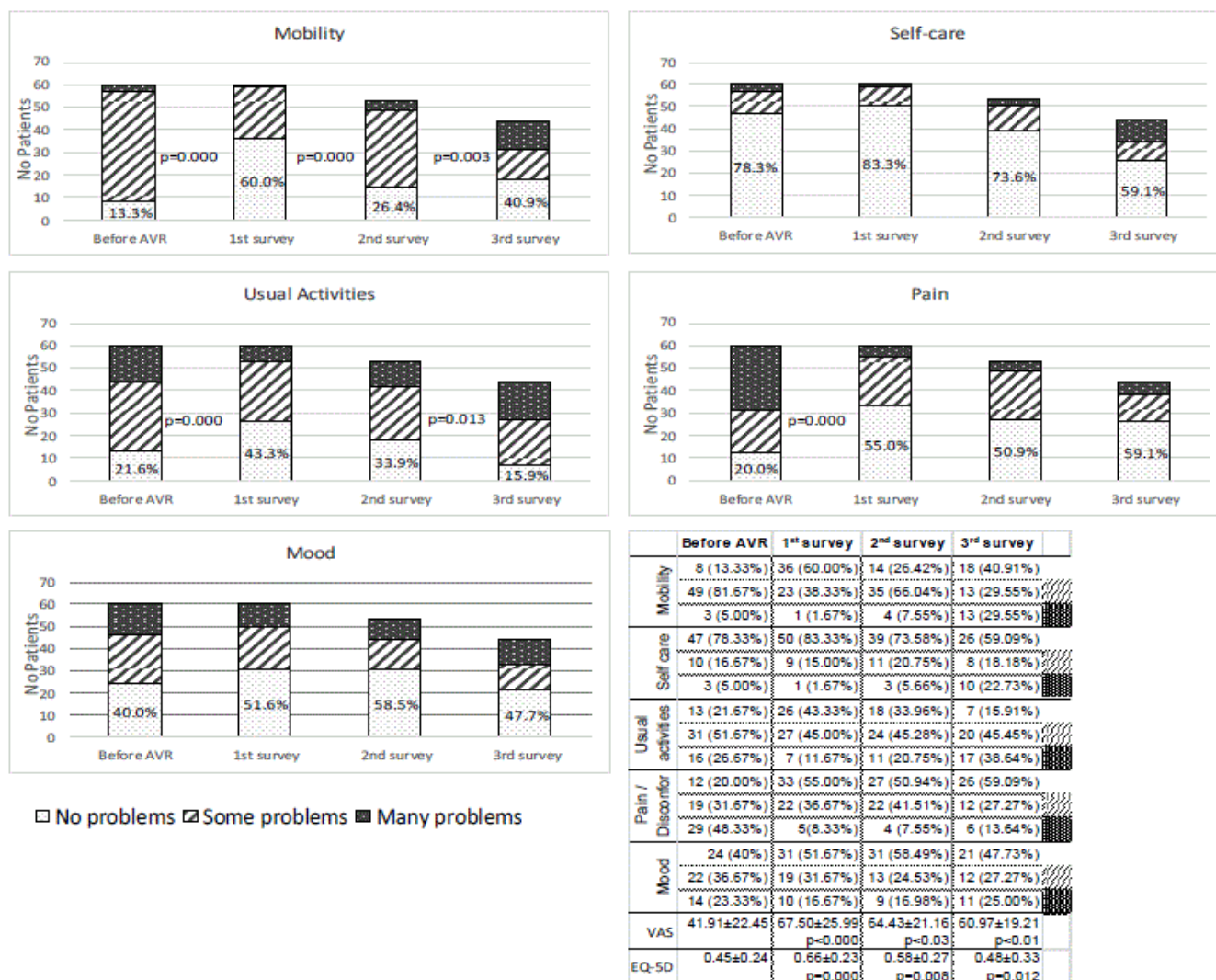


Figure 1: Dimensions of quality of life (number and percentage). AVR: Aortic Valve Replacement.

Methods

An observational and descriptive study was conducted from January 2006 to July 2008. One hundred-three Caucasians patients over 80 years of age codified in the Registry Service of the Central University Hospital of Asturias as AVR were followed-up. A heart team from the Department of Cardiology determined the surgical indication. Patients were advised that participation in the study was voluntary. Authorization for access to medical records and data processing was requested from the Medical Director of the Hospital and the Hospital Registry Service, which provided the corresponding commitment of confidentiality. To minimize losses in the selected patients a request to was made to the primary care physicians. To confirm the dates and causes of death, a request to the Civil Registry of Deaths was also made.

The study was designed in two phases. The first phase consisted of a review of medical records, and the second phase involved three successive telephone surveys. The first interview was made in August

2009, the second in February 2011 and final in February 2013. A group of 166 individuals over 80 years of age (106 females and 60 males) interviewed by the Health Service of Asturias in 2008 in order to know the QOL of the Asturias population served as the control. In both interviews, the EQ-5D questionnaire was used.

The EQ-5D questionnaire explores several items. The first item analyses mobility, self-care, usual activities, pain-discomfort and anxiety-depression with three levels of severity, resulting in 243 possible health states. The second instrument used was a vertical visual analogue scale (VAS). The third was the EQ-5D index. This index begins with a score of 1, and then, correction factors are applied. The correction factors in Spain are shown in Table 1 (A).

Statistical analysis

Data were analysed using the statistical package SPSS IBM (Version 19). Categorical variables were compared and analysed using McNemar's test. Continuous variables obtained with the EQ-index

and VAS scores, were analysed using Student's t-tests. Comparisons with the control group were conducted using Student's t-tests for independent samples with the EPIDAT-3.1 statistical package. Chi-squared tests were used to identify the profile of patients, who exhibited the greatest benefit from surgery.

Constant	0.1502
Mobility	0.0897
Self-Care	0.1012
Usual activities	0.0551
Pain/discomfort	0.0596
Anxiety/depressions	0.0512
N3	0.2119

Table 1(A): EQ-5D index. Correction factors in Spain. N3 is subtracted if some dimension reaches 3.

Cause	Number
Coding error (not AVR surgery)	5
Death prior the surgery	7
Refused surgery	1
Not found (change of address)	3
Refused to participate	1
TOTAL	17

Table 1 (B): Causes of exclusion in the survey.

Results

From an initial cohort of 103 patients, 17 patients were excluded and 86 patients (46 females and 40 males) were evaluated. The causes of exclusion of patients in the survey are showed in Table 1(B), mainly those that finally did not underwent AVR. Table 1(C) summarizes the associated comorbidities and Table 2(A) outlines the baseline patient characteristics and procedures. The first, second, and third surveys included 60, 53 and 44 patients respectively. Attrition was due to the inability to contact subjects. The overall mortality was 47.7%. Differences in QOL perception were observed between females and males; thus, comparisons with the control group were conducted according to gender.

Mobility

For mobility after AVR, 60% of patients answered with "no difficulty". At the time of the second survey, 66% of patients referred to "some difficulties". Impaired mobility was associated with dyspnoea, lumbar arthritis, neurological disease and stroke. The third survey indicated a progressive worsening of mobility, and nearly 30% of patients were confined to bed due to Alzheimer's disease, stroke and dyspnoea. McNemar's test revealed a significant improvement of mobility between pre-intervention and the first survey and worsening in comparisons with the other surveys (Figure 1).

Nearly 70% of the males in the control group reported no difficulty in walking, and 53.3% of females in the control group had no difficulties with mobility (Figure 2).

Comorbidity	n (%)
Systemic Hypertension	74 (86.0%)
Coronary disease	41 (47.7%)
Smoking habit	20 (23.3%)
Diabetes	21 (24.4%)
COPD	23 (26.7%)
PAD	15 (17.4%)
Renal insufficiency	11 (12.8%)
Hypercholesterolemia	48 (55.8%)
Atrial fibrillation	33 (38.4%)
Previous CABG	6 (7.0%)
Obesity	42 (48.8%)
Congenital valvular malformation	Bicuspid valve 3 (3.5%) VSD 1 (1.25%)

Table 1 (C): Associated comorbidities of patients (n° and %). COPD: Chronic obstructive pulmonary disease; PAD: Peripheral Artery Disease; CABG: Coronary Artery Bypass Graft.

Self-care

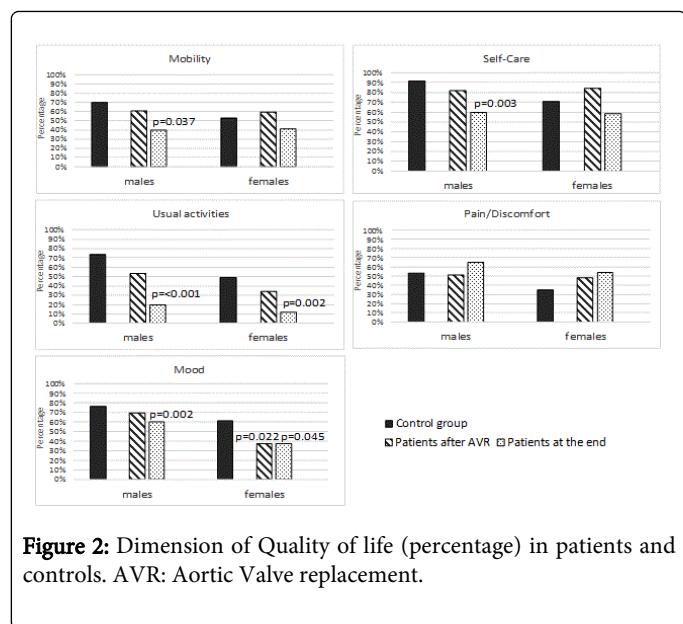
A small improvement in self-care was observed after AVR, but as patients advanced in age, 41% of patients experienced difficult in self-care. McNemar's test did not indicate significant differences (Figure 1).

In the control group, 91.2% of males were able to wash without assistance compared with 82.2% of patients. At the end of the study, only 60% of patients could wash without assistance. In females, 70.5% of the controls were capable of washing alone. Among female patients, 84.4% and 58.8% were able to wash without assistance after surgery and at the end of the study, respectively (Figure 2).

Usual activities

Patients experienced a significant improvement in their ability to complete usual activities after AVR; however, at the end of the study, only seven people stated they were self-sufficient (Figure 1). The mean patient age in the final survey was 87 years, and most were cared for by relatives or institutionalized. McNemar's test indicated a significant improvement in usual activities after AVR (Figure 1).

In controls, 73.3% and 49.1% of males and females, respectively, were able to perform everyday tasks without difficulty. In patients, 53.6% and 34.3% of males and females could perform everyday tasks. At the final survey, these percentages significantly decreased to 20% in males and 12.5% in females (Figure 2).



Pain discomfort

After AVR, the percentage of patients with extreme pain decreased from 48.3% to 8.3%. In the second survey a slight worsening was

observed, and in the third, the results were polarized (Figure 1). Pain was attributed to lumbar osteoarthritis. Further, caregivers of patients confined to bed due to neurological disease did not identify signs of pain in the patients; thus an increase in patients without discomfort was observed. McNemar’s test indicated significant differences when comparing the period prior to AVR and the first survey (Figure 1).

The percentage of asymptomatic males and females in the control group was 53.4% and 34.9%. After surgery, 51.5% of males and 48.5% of females reported no pain or discomfort. At the final survey, these percentages increased to 65% in males and 54.2% in females (Figure 2).

Mood

An improvement in mood was observed after AVR. The second survey also showed an increase in asymptomatic patients but a decrease at the third survey. Finally, the percentage of patients who felt extremely depressed in the second survey increased from 17% to 25% in the last survey. McNemar’s test indicated no significant differences (Figure 1).

The percentage of asymptomatic males and females in the control group was 76.7% and 61.3%. After surgery, 69.7% and 37.5% of males and females were asymptomatic. At the final survey, 60% and 37.5% in males and females were asymptomatic, and this decrease was significant (Figure 2).

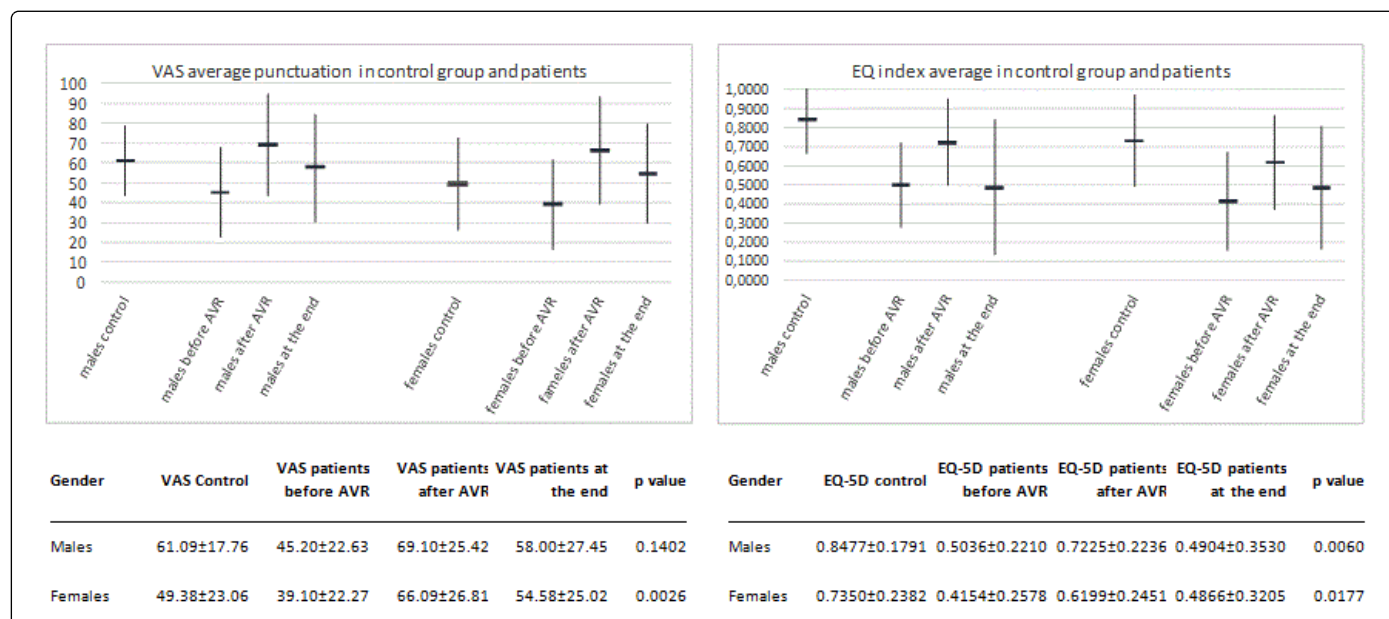


Figure 3: Evolution of VAS and EQ index values segregated by sex in patients and controls. Both men and women perceive an improvement in their quality of life after AVR which decreases over time.

Visual analog scale (VAS)

The mean VAS score prior AVR was 4.91 ± 22.45 and increased to 67.5 ± 25.99 after AVR. In the second survey, the mean VAS was 64.43 ± 21.16 and in the final survey, the mean VAS was 60.97 ± 19.12 . In the third survey, 41 patients completed the VAS because three patients had neurological disease and were unable to have their health status assessed. As an alternative response, we considered NK/NA as the

response. The observed change after the intervention was significant (Figure 1).

The VAS was 69 in male patients after AVR and 61 in the control group; no significant differences were between these groups observed. Significant differences were observed in females after AVR. This difference was also observed at the final survey, with a mean VAS score of 54.58 ± 25.01 in female patients (Figure 3).

EQ-5D index

The mean EQ-5D index was 0.45 ± 0.24 prior to AVR and 0.66 ± 0.23 after AVR. In the second and third survey, the EQ-5D indices decreased to 0.58 ± 0.27 and 0.48 ± 0.33 . Statistically significant differences were observed between the pre-intervention and the first survey. The second and third surveys were also significantly different, although in the opposite direction (Figure 1).

Males controls had a mean EQ-5D index of 0.8477, and after AVR, patients had a mean EQ-5D index of 0.722. At the final survey, the mean male patients EQ-5D index was 0.490 ± 0.352 . Female controls had a mean value of 0.735. Female patients had a mean EQ-5D index of 0.619 after AVR and, 0.486 ± 0.322 at the final survey. In both cases, these differences were significant (Figure 3).

Age	n		%
	82.23 ± 1.63		
	range (80.07-87.86)		
Gender	Males	40	46.50%
	Females	46	53.50%
FC NYHA	I	0	0.00%
	II	30	34.90%
	III	40	46.50%
	IV	16	18.60%
euroSCORE	<7	24	27.90%
	>7	62	72.10%
Surgical programming	Urgent	11	12.80%
	Elective	75	87.20%
Surgical procedure	AVR	54	62.80%
	AVR+CABGx1	17	19.80%
	AVR+CABGx2	9	10.50%
	AVR+CABGx3	1	1.20%
	AVR+AG	3	3.50%
	AVR+AG+CABGx3	2	2.30%

Table 2 (A): Baseline characteristics of patients and procedure performed. AVR: aortic valve replacement; AVR+CABGx1: aortic valve replacement+coronary artery bypass graftx1; AVR+CABGx2: aortic valve replacement+coronary artery bypass graftx2; AVR+CABGx3: aortic valve replacement+coronary artery bypass graftx3; AVR+AG: aortic valve replacement+aortic graft; AVR+AG+CABGx3: aortic valve replacement+aortic graft+coronary artery bypass graft.

Final survey question: Was it worth undergoing surgery?

This question was included only in the first survey because it was the nearest time point to the intervention and reflected its greatest possible impact; only 13 patients believed that the surgery had not met their expectations.

We considered a greater than 50% increase in the EQ-5D index as representing the best patients benefit from AVR; 24 patients met this requirement. The type of procedure was grouped into isolated AVR compared with AVR combined with other procedures. For the NYHA functional class, we grouped grades II and III for comparison with grade IV. We compared all of the aspects of the survey between the patients with some or great difficulty and those with no problems. The results are shown in Table 2(B).

Variables	p value
Procedure performed	0.515
NYHA Class IV	0.003
Mobility	0.013
Self-care	0.015
Usual activities	0.159
Pain	0.002
Mood	0.747

Table 2 (B): Variables of patients who most benefited in terms of quality of life after AVR (Chi-squared test).

Discussion

The costs of health interventions directly affect the social welfare state; thus, it is essential to efficiently employ interventions because resources are becoming scarce. Studying QOL from a subjective perspective will provide additional insight into pathologies and their treatment. QOL is a complement to purely biomedical models as clinical guidelines because the patient's subjective assessment provides a more complete perspective of reality and reveals the real impact of therapeutic interventions [13].

QOL related to health is limited to healthcare and health status. The EQ-5D questionnaire is a tool designed to link and evaluate the overall QOL and HRQOL because it explores domains in both healthcare and health status. It provides different measures that reflect health status from physical, mental and social perspectives and evaluates subjective variables and objective quantitative value to represent health status.

Aging is not synonymous with illness or disability; however, a significant percentage of elderly will develop severe illness and become dependent on others [14-16]. According to the Spanish National Institute of Statistic (INE), 5.34% of the Spanish population is greater than 80 years of age [17].

Analysing QOL is complex, and the results differ depending on the population evaluated. Clear social and cultural components exist and are reflected by VAS scores, with higher scores in Nordic countries, young individuals, and males and in individuals with higher education. Similarly, not all dimensions have the same value in different cultures. The Spanish value mobility and personal hygiene more than pain/discomfort, unlike people in the UK, where pain/discomfort is most important.

The main purpose of AVR in octogenarians should not be understood only as a means to increase the longevity of patients, but also to improve QOL. The most important finding of this study was to confirm the improvement in QOL after AVR; 78.3% of patients substantially improved their quality of life. Pain/discomfort was most

improved, as reflected not only by the number of patients reporting reductions or the disappearance of symptoms but also the maintained improvement throughout follow-up. In our cohort, there was an overestimation of pain compared with other dimensions, likely due to the severity of the cardinal symptoms of aortic stenosis. In the Shapira series, 78% of patients described their health as good [18], and Huber reported that 72% of patients were free of pain or angina symptoms [19]. Calvo found that 76.3% of patients remained in NYHA functional class I-IV after intervention [14].

Quality of life for the elderly is expressed in four dimensions classified from highest to lowest priority: health, family, income and social network. Elderly individuals with adequate family networks enjoy better QOL [20]. In this sample, the majority of patients had family support, and only 6.7% were institutionalized. This support was also reflected in the area of daily activities, as patients who completed the follow-up period did not perform household chores and depended on their caregivers.

Health perceptions differ when using the VAS (subjective value) or EQ-5D index (objective and quantitative value) to assess health. The EQ-5D index scores are generally higher than those of the VAS; individuals feel that their quality of life is worse than it really is. The perception of health in the general population is pessimistic, and this perception intensifies with age. This difference is greater in southern European countries and in women.

The Austrians population has been the subject of several health surveys conducted by the health service advisor, and differences between VAS and social indexes have been observed. Patients improved considerably after AVR compared with controls, although the improvement diminishes with time. At the end of the follow-up, the VAS and EQ-5D index scores reversed: health perception was better than the real situation. Patients were optimistic about their QOL.

Several reasons may explain this reversal of VAS and EQ-5D index scores, such as a lack of discrimination of the EQ-5D index in cases of knee osteoarthritis and the weight given to the area of mobility [10]. Another possible reason could be that patients are pleased with the results of the operation and attribute less importance to less severe comorbidities.

Conclusions

We conclude that AVR leads to a significant improvement in subjective QOL items. However, this improvement was not evident for objective health variables. Thus, patients remain different from controls in terms of VAS and EQ-5D index scores. Mobility, self-care and pain/discomfort were the determinant items for surgery success. Patients with better results in terms of the EQ-5D index had severe cardinal symptom of aortic stenosis. Finally, systematically incorporating QOL surveys in clinical practice can be a very useful tool in the therapeutic approach of patients undergoing AVR.

Study Limitation

The follow-up period was very long, and patients may have had a memory bias because the first survey was not conducted prior AVR.

However, due to its simplicity, EQ-5D may be considered a valid option in patients whose age may hinder the use of more complex models.

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