

Survival and quality of life of octogenarians who underwent mechanical valve replacement at a younger age

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Abstract

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Objectives. Mechanical valve replacement is associated with complications, however, there is little information on the quality of life (QOL) of octogenarians who had undergone mechanical valve replacement at a relatively younger age. We examined survival, valve-related events and the QOL of octogenarians who had undergone

30 mechanical valve replacement.

Methods. Fifty-six octogenarians who underwent mechanical valve replacement between 1969 and 1997 (age at time of surgery, 65.6 ± 6.7 years), completed a questionnaire on survival, valve-related events, the QOL (basic activities of daily living, instrumental activities of daily living and mental health).

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Results. The mean follow-up was 12.4 ± 6.6 years, and the cumulative follow-up period was 642.4 patient-years. Six valve-related deaths (0.9%/patient-year) were registered during the follow-up. Furthermore, 11 valve-related events (1.8%/patient-year) were recorded. The mean age of the 21 survivors was 82.9 ± 1.8 years, and 19 of the survivors lived at home. Their QOL was excellent.

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Conclusion. The valve-related deaths and events in octogenarians who had previously undergone mechanical valve replacement at young age were within acceptable limits. The QOL was similar to that of octogenarians described in previous studies.

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Key words. octogenarians; valve surgery; quality of life

INTRODUCTION

Octogenarians are increasing segment of the population especially in Japan, and
50 cardiac surgery is being conducted in this population. According to the 2006
guidelines of the American College of Cardiology Foundation/American Heart
Association¹, after obtaining a signed informed consent for valve replacement surgery,
the common recommendation is the use of mechanical valve for patients under the
age of 65 and tissue valve for patients exceeding that age. Today, many patients who
55 had undergone mechanical valve replacement surgery at a relatively younger age
remain alive. To our knowledge, however, there is little or no information on the
quality of life (QOL) of octogenarians who had undergone mechanical valve
replacement at younger age. The purpose of this study was to examine the QOL of
the octogenarians who had previously undergone mechanical valve replacement.

METHODS

Questionnaire

We used a semi-structured interview based on the methodology of physical and
65 mental health. The study was approved by the research ethics board of our institution
to approach patients for interview/questionnaire and assessment of functional status.
For patients who were unable to respond, the questionnaire was either administered
to a close family member or nursing staff if the patient was institutionalized. A
questionnaire on the following items was sent to 56 octogenarians who had
70 undergone mechanical valve replacement between 1969 and 1997: survival,

valve-related events, QOL, and warfarin compliance. With regard to prosthetic valve-related complications, the following items were investigated, based on the study of Edmunds et al.²: (1) structural deterioration of the valve, (2) nonstructural dysfunction, (3) valve thrombosis, (4) embolism, (5) bleeding events, (6) operated
75 valve-related endocarditis.

The QOL status was recorded based on the response to the questionnaire, using items from the Barthel Index score (BI) for basic activities of daily living (BADL), the Fillenbaum IADL score (FIADL) for instrumental activities of daily living (IADL), and from the Vitality Index (VI) for mental health. The BI is evaluated by the following
80 10-items with a total score of 100 points; feeding, bathing, grooming, dressing, defecation, urination, toilet use, transfers (bed to chair and back), mobility (on level surfaces), and stairs. FIADL is evaluated by the following five-items with a total score of 5 points; travel, shopping, meal preparation, housework, and handling personal finances. VI is evaluated by the following five items with a total score 10 points;
85 waking up, communication, feeding, on and off toilet, and activity.

Patients

The study included 56 patients (30 men and 26 women), representing all patients who underwent mechanical valve replacement between 1969 and 1997 in our hospital (age at time of surgery: 65.6 ± 6.7 years), and currently aged 80-89 years old. Aortic
90 valve replacement (AVR) was performed on 24 patients, and mitral valve replacement (MVR) on 32 patients. Concomitant procedures were performed in 13 patients (tricuspid annuloplasty in 10 patients, tricuspid valve replacement in 1 patient, coronary artery bypass grafting in 1 patient, and closure of a ventricular septal defect in 1 patient). All patients were operated on using the cardiopulmonary bypass

95 technique. After surgery, all patients were placed on anticoagulation therapy with warfarin that maintained the international normalized ratio between 1.5 and 2.5.

RESULTS

The mean follow-up period after cardiac valve surgery was 12.4 ± 6.6 years (range, 100 0.2 to 24.2). The survivors were 21 patients, 31 patients developed late deaths and 4 patients were lost during the follow-up. The cumulative follow-up period was 642.4 patient-years.

Survival

105 There were 21 survivors and 31 late deaths. 31 deaths were registered (embolism in 2 patients, bleeding event in 4, other cardiac events in 3, non-cardiac events in 22). 6 valve-related deaths were registered. Thus, the incidence of valve-related deaths was 0.9%/patient-years.

110 Valve-related events

Eleven patients developed valve-related events, including major thromboembolism events (0.8% per patient-year, 5 events), bleeding event (0.6% per patient-year, 4 events), operated valve endocarditis (0.2% per patient-year, 1 event), and nonstructural valve dysfunction (paravalvular leak) (0.2% per patient-year, 1 event). 115 The latter two patients required reoperation. None of the patients developed structural valve deterioration or valve thrombosis. The net incidence of valve-related events was 1.8% per patient-year.

Quality of life

120 The mean age of the 21 survivors at the time of the study was 82.9 ± 1.8 years (range, 81-87 years, 11 men and 10 women male). The AVR and MVR of 11 and 10, respectively. Of the 21 survivors, 19 lived at home and 2 were in a supervised setting. The mean scores of the BI, FIADL, and VI for all survivors were 90.9 ± 2.5 , 4.05 ± 1.7 , and 8.8 ± 0.9 , respectively. For octogenarians who lived at home, the mean scores of
125 the BI, FIADL, VI were 98.9 ± 2.6 , 4.47 ± 1.2 , 8.89 ± 0.9 , respectively. On the other hand, the 2 octogenarians who lived in a supervised setting had a BI of 15, FIADL of 0, and a VI of 8 (Table 1). Warfarin compliance was excellent in all survivors.

Discussion

130 Very few studies have focused on the QOL of octogenarians who had undergone mechanical valve replacement at younger age. From this point of view, we assumed the QOL scores were good for octogenarians who had previously undergone mechanical valve replacement at a relatively younger age. We examined the QOL of octogenarians who underwent mechanical valve replacement at a relatively younger
135 age.

Edmunds et al.² described that the two most common long-term complications of prosthesis valve replacement are embolism and bleeding events. Khan et al.³ described the results of long-term follow-up (defined as 20 years after prosthetic valve replacement), and demonstrated no significant differences in the rates of
140 embolism that develop after aortic/mitral tissue valve than after mechanical valve. In a study of octogenarians who underwent AVR for aortic valve stenosis, Vincentiis et al.⁴ reported a better survival rate in the mechanical valve group than the tissue valve group. In our study, the rate of embolism events was 0.8% per patient-year while that of bleeding events was 0.6% per patient-year, with a net incidence of valve-related

145 events of 1.8% per patient-year, which was better than that reported in the above
studies. This may be due to the anticoagulation therapy being deemed most
appropriate for the Japanese as recommended by The Japanese Circulation Society
guidelines.

The QOL in the elderly is influenced by the general state of health,
150 socio-economic status, and environmental factors. Evaluation of physical status and
physical activity is necessary in order to determine state of health. While physical
condition is evaluated by standard inspection, physical activity is determined by the
degree of physical, mental and social activities, with the compiled statistics on these
items are then used to assess the QOL. The Short Form-36⁵ is one of the methods
155 used for the evaluation of QOL in the elderly, which consists of multiple factors. In the
present study, we used the BI to evaluate BADL, the FIADL to evaluate IADL and the
VI to evaluate mental health. The reason for the selection was that many of the
questions in the SF-36 are difficult for Japanese octogenarians to answer due to the
fact that SF-36 was developed for European and Americans. The BI was published by
160 Mahoney and Barthel⁶ in 1965 and is a simple, convenient BADL assessment tool
containing 10 items that evaluate daily activities such as feeding and bathing. BI was
evaluated to undergo treatment at less than 60 points and severe treatment at less
than 40 points, respectively. The reliability and validity of the BI have both been
established, and the test is currently used worldwide.⁷

165 Lawton et al.⁸ advocated the 8-item IADL assessment designed to measure
more demanding activities as opposed to physical activities. Fillenbaum et al.⁹ then
advocated the FIADL (the 5-item IADL scale) which is brief, easy to administer, and
easy to answer. Very few studies have focused on classification of FIADL score, but it

has been reported that high score of FIADL is living at home from living
170 independently.

Lack of mental health is defined as experiencing lack of emotion, excitement
and interest, which triggers a decline in physical state, chronic inflammation, and
malnutrition. As such, assessment of mental health provides insight into the physical
state in the elderly individual. In contrast, a simple frailty scale is reported to predict
175 the survival of elderly people living in community-dwelling.¹⁰ We used the Vitality
Index (VI) that was established by Toba et al.¹¹ to measure vitality related to activities
of daily living in the elderly. The distinct features of the VI include the following: 1) the
index is short, consisting of only 5 questions (total of 10 points), 2) evaluation can be
carried out in a short period of time, 3) evaluation can be carried out through
180 caregiver observation with high degree objectivity and reproducibility, 4) correlates
significantly with life expectancy, and 5) is highly sensitive to non-pharmacological
interventions. Low score of VI (7points or less) is independent risk factor for survival.

In the present study, the BI was 90.9 ± 2.5 , FIADL was 4.0 ± 1.7 , and VI was
 8.8 ± 0.9 . Survivors living at home showed a BI of 98.9 ± 2.6 , FIADL of 4.5 ± 1.2 and
185 VI of 8.9 ± 0.9 . The respective values in those who lived in a supervised setting were
15, 0, and 8, indicating that the IADL is low in conjunction with the BADL. However,
the VI did not necessarily correlate with low ADL. A previous study acknowledged that
approximately 5% of elderly people who live at home had low BADL score, whereas
IADL was often 70% to 80% lower than that of groups with sustained BADL.

190 Chisaka et al.¹² investigated octogenarians and reported a BI between 93.2 to 96.9.
On the other hand, Kirino et al.¹³ indicated that the average BI of subjects aged ≥ 65
years living in a supervised setting was 33.4.

With regard to open cardiac surgery and QOL after surgery in octogenarians, Chaturvedi et al.¹⁴ reported that the actuarial survival at 5 years after surgery was 57.8%. Of the survivors at 3.6 years postoperatively, 64.9% lived autonomously, 28.1% semiautonomously, and 9.2% were dependent in their daily living. Their group consisted of 71.8% living at home and 21.2% in institutions. In our study, the BI of the entire group was 90.9, whereas that of individuals living at home was 98.9. A low BADL invites circumstances in which one might require a caregiver, and a low IADL suggests a low BADL. A low IADL accounts for 25% from 15% of the elderly population, in this study as well, as it was accounted in 19% of all survivors and in 10% of survivors living at house.

Toba et al.¹¹ reported that a low VI is an independent and significant risk factor for survival. The VI of survivors living at home was 8.9 ± 0.9 and that of survivors living in a supervised setting was 8. In survivors living in a supervised setting, the BI and FIADL were low, whereas the VI was constant. The VI of all survivors was excellent. In other words, the VI was not low even though the BI and FIADL were low. Taking into consideration these results, the QOL scores were excellent for octogenarians who underwent mechanical valve replacement at a relatively younger age.

Conclusion

The valve-related events and warfarin compliance were acceptable in octogenarians who had previously undergone mechanical valve replacement at younger age. The QOL was equivalent to that of similar octogenarians in comparison studies.

Table 1; QOL of all survivors.

This table shows the QOL of all survivors. QOL; quality of life, BI; Barthel index,

220 FIADL; instrumental activities of daily living described by Fillenbaum, VI; Vitality index

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arrangements, and leisure activities. *Ann Thorac Surg* 2010; 89: 805-810

Table 1

Survivors(n)	BI	FIADL	VI
All patients (21)	90.95 ± 2.5	4.05 ± 1.7	8.81 ± 0.9
Living at home (19)	98.95 ± 2.6	4.47 ± 1.2	8.894 ± 0.9
Living at supervised setting (2)	15	0	8
